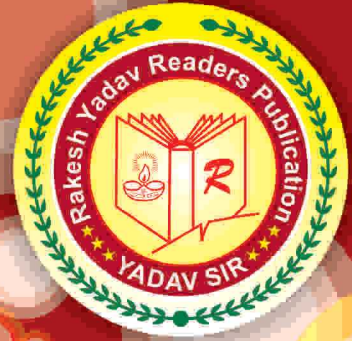




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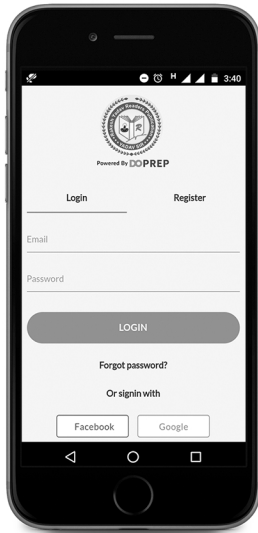
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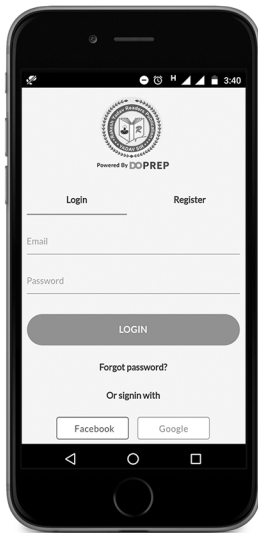


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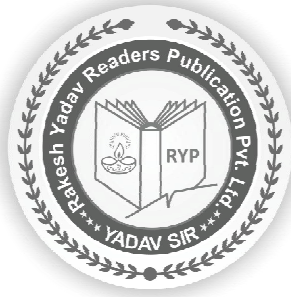
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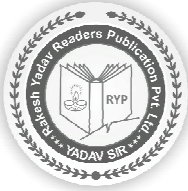
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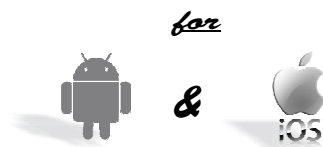
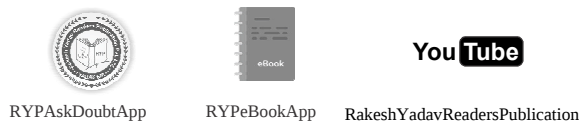
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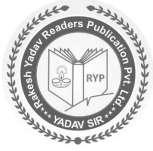


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01

Percentage

How to change % into fraction

RY - I

$$20\% = \frac{20}{100} = \frac{1}{5}$$

$$25\% = \frac{25}{100} = \frac{1}{4}$$

$$40\% = \frac{40}{100} = \frac{2}{5}$$

$$70\% = \frac{70}{100} = \frac{7}{10}$$

$$16\frac{2}{3}\% = \frac{50}{3}\% = \frac{1}{6}$$

$$14\frac{2}{7}\% = \frac{100}{7}\% = \frac{1}{7}$$

RY - II

How to change the fraction into %

$$\frac{1}{5} \Rightarrow \frac{1}{5} \times 100 = 20\%$$

$$\frac{1}{4} \Rightarrow \frac{1}{4} \times 100 = 25\%$$

$$\frac{1}{6} \Rightarrow \frac{1}{6} \times 100 = \frac{50}{3} = 16\frac{2}{3}\%$$

$$\frac{1}{9} \Rightarrow \frac{1}{9} \times 100 = \frac{100}{9}\% = 11\frac{1}{9}\%$$

RY - III

The following fractions are generally used in exams. So, I recommend you to remember these fractions. These fractions are very useful to solve the

lengthy questions with in time.

$$\frac{1}{2} = 50\% \quad \frac{1}{11} = 9\frac{1}{11}\% \quad \frac{1}{40} = 2\frac{1}{2}\%$$

$$\frac{1}{3} = 33\frac{1}{3}\% \quad \frac{1}{12} = 8\frac{1}{3}\% \quad \frac{1}{50} = 2\%$$

$$\frac{1}{4} = 25\% \quad \frac{1}{13} = 7\frac{6}{13}\% \quad \frac{3}{8} = 37\frac{1}{2}\%$$

$$\frac{1}{5} = 20\% \quad \frac{1}{14} = 7\frac{1}{7}\% \quad \frac{5}{8} = 62\frac{1}{2}\%$$

$$\frac{1}{6} = 16\frac{2}{3}\% \quad \frac{1}{15} = 6\frac{2}{3}\% \quad \frac{4}{7} = 57\frac{1}{7}\%$$

$$\frac{1}{7} = 14\frac{2}{7}\% \quad \frac{1}{16} = 6\frac{1}{4}\% \quad \frac{5}{7} = 71\frac{3}{7}\%$$

$$\frac{1}{8} = 12\frac{1}{2}\% \quad \frac{1}{20} = 5\% \quad \frac{1}{9} = 11\frac{1}{9}\%$$

$$\frac{1}{24} = 4\frac{1}{6}\% \quad \frac{1}{10} = 10\% \quad \frac{1}{25} = 4\%$$

RY - IV

These are Basic Fraction.

(i) If I want to know the % value of $\frac{5}{9}$ then go to $\frac{1}{9}$

$$\frac{1}{9} = 11\frac{1}{9}\% = \left(11 + \frac{1}{9}\right)\%$$

$$\frac{5}{9} = 55\frac{5}{9}\%$$

(ii) Find the % value of $\frac{3}{8}$

$$\frac{1}{8} = 12\frac{1}{2}\% = \left(12 + \frac{1}{2}\right)\%$$

$$\frac{3}{8} = 36 + \frac{3}{2} = 36 + 1\frac{1}{2} = 37\frac{1}{2}\%$$

(iii) Find the % value of $\frac{5}{6}$

$$\frac{1}{6} = 16\frac{2}{3}\% = 16 + \frac{2}{3}$$

$$\frac{5}{6} = 80 + \frac{10}{3}$$

$$= 80 + 3\frac{1}{3}\% = 83\frac{1}{3}\%$$

(iv) Find the % value of $\frac{2}{3}$

$$\frac{1}{3} = 33\frac{1}{3}\% = \left(33 + \frac{1}{3}\right)\%$$

$$\frac{2}{3} = 66 + \frac{2}{3} = 66\frac{2}{3}\%$$

(v) Find the % value of $\frac{5}{8}$

$$\frac{1}{8} = 12\frac{1}{2}\% = 12 + \frac{1}{2}$$

$$\frac{5}{8} = 60 + \frac{5}{2} = 60 + 2\frac{1}{2} = 62\frac{1}{2}\%$$

(vi) Find the % value of $\frac{4}{7}$

$$\frac{1}{7} = 14\frac{2}{7}\% = 14 + \frac{2}{7}\%$$

$$\frac{4}{7} = 56 + \frac{8}{7}\% = 56 + 1\frac{1}{7} = 57\frac{1}{7}\%$$

(vii) Find the % value of $\frac{7}{12}$

$$\frac{1}{12} = 8\frac{1}{3}\% = 8 + \frac{1}{3}\%$$

$$\frac{7}{12} = 56 + \frac{7}{3} = 56 + 2\frac{1}{3} = 58\frac{1}{3}\%$$

(viii) Find the % value of $\frac{11}{15}$

$$\frac{1}{15} = 6\frac{2}{3}\% = 6 + \frac{2}{3}\%$$



$$\frac{11}{15} = 66 + \frac{22}{3} \%$$

$$= 66 + 7\frac{1}{3} \% = 73\frac{1}{3} \%$$

(ix) Find the % value of $\frac{9}{16}$

$$\frac{1}{16} = 6\frac{1}{4} \% = 6 + \frac{1}{4} \%$$

$$\frac{9}{16} = 54 + \frac{9}{4} = 54 + 2\frac{1}{4} \%$$

$$= 56\frac{1}{4} \%$$

(x) Find the % value of $\frac{7}{40}$

$$\frac{1}{40} = 2\frac{1}{2} \% = 2 + \frac{1}{2} \%$$

$$\frac{7}{40} = \left(14 + \frac{7}{2}\right) \% = 17\frac{1}{2} \%$$

RY - V

How to change the fraction whose % value is more than 100%

(i) Find the % value of $\frac{7}{5}$

$$\begin{aligned} \frac{7}{5} &\Rightarrow \frac{5}{5} + \frac{2}{5} \\ &\Rightarrow 100\% + 40\% \\ &\Rightarrow 140\% \end{aligned}$$

(ii) Find the % value of $\frac{35}{8}$

$$\frac{35}{8} = \frac{32}{8} + \frac{3}{8}$$

$$= 400\% + 37\frac{1}{2} \% = 437\frac{1}{2} \%$$

(iii) Find the % value of $\frac{33}{7}$

$$\frac{33}{7} = \frac{28}{7} + \frac{5}{7}$$

$$= 400 \% + 71\frac{3}{7} \% = 471\frac{3}{7} \%$$

(iv) Find the % value of $\frac{23}{12}$

$$\frac{23}{12} = \frac{12}{12} + \frac{11}{12}$$

$$= 100\% + 91\frac{2}{3} \% = 191\frac{2}{3} \%$$

Alternatively:

$$\frac{23}{12} = \frac{24}{12} - \frac{1}{12}$$

$$= 200\% - 8\frac{1}{3} \% = 191\frac{2}{3} \%$$

(v) Find the % value of $\frac{41}{6}$

$$\frac{41}{6} = \frac{42}{6} - \frac{1}{6}$$

$$= 700\% - 16\frac{2}{3} \% = 683\frac{1}{3} \%$$

RY - VI

How to change % into fraction whose % value is more than 100%

(i) Find the fraction value of

$$157\frac{1}{7} \%$$

$$157\frac{1}{7} \% = 100\% + 57\frac{1}{7} \%$$

$$= 1 + \frac{4}{7} = \frac{11}{7}$$

(ii) Find the fraction value of

$$616\frac{2}{3} \%$$

$$616\frac{2}{3} \% = 600\% + 16\frac{2}{3} \%$$

$$= 6 + \frac{1}{6} = \frac{37}{6}$$

(iii) Find the fraction value of

$$366\frac{2}{3} \%$$

$$366\frac{2}{3} \% = 300\% + 66\frac{2}{3} \%$$

$$= 3 + \frac{2}{3} = \frac{11}{3}$$

(iv) Find the fraction value of

$$208\frac{1}{3} \%$$

$$208\frac{1}{3} \% = 200\% + 8\frac{1}{3} \%$$

$$= 2 + \frac{1}{12} = \frac{25}{12}$$

RY - VII

How to understand the actual meaning of fraction.

$$16\frac{2}{3} \% = \frac{1}{6} \rightarrow 1 \text{ represents its \% result}$$

$$\frac{1}{6} \rightarrow 6 \text{ represent original number/value}$$

$$\rightarrow 14\frac{2}{7} \% = \frac{1}{7}$$

$$\text{means } 7 \times 14\frac{2}{7} \% = 1$$

$$\rightarrow 62\frac{1}{2} \% = \frac{5}{8}$$

$$\text{means } 8 \times 62\frac{1}{2} \% = 5$$

$$\rightarrow 37\frac{1}{2} \% = \frac{3}{8}$$

$$\text{means } 8 \times 37\frac{1}{2} \% = 3$$

RY - VIII

QUESTIONS BASED ON FRACTION

1. If $37\frac{1}{2} \%$ of a number is added with itself then result becomes 1320. Find the original number.

Detailed Method :

Let the original number be x
According to the question,

$$x + x \times 37\frac{1}{2} \% = 1320$$

$$x + x \times \frac{3}{8} = 1320$$

$$\frac{8x + 3x}{8} = 1320$$



$$\frac{11x}{8} = 1320$$

$$x = 1320 \times \frac{8}{11} = 960$$

Fraction Method:

$$37\frac{1}{2}\% = \frac{3}{8} \rightarrow \text{Original Number}$$

Original number = 8 unit

Result formed = 8 unit + 3 unit

$$\left[8 \times 37\frac{1}{2}\% = 3 \right]$$

$$11 \text{ unit} \rightarrow 1320$$

$$1 \text{ unit} \rightarrow 120$$

$$\text{So, the original number} = 8 \times 120 = 960$$

2. If $62\frac{1}{2}\%$ of a number is subtracted from itself then result becomes 6321. Find the original number.

Detailed Solution,Let the original number = x

A.T.Q,

$$x - x \times 62\frac{1}{2}\% = 6321$$

$$x - x \times \frac{5}{8} = 6321$$

$$\frac{3x}{8} = 6321$$

$$x = 16856$$

Fraction method :

$$62\frac{1}{2}\% = \frac{5}{8}$$

$$\left[8 \times 62\frac{1}{2}\% = 5 \right]$$

Original number = 8 unit

Result formed = 8 unit - 5 unit

$$3 \text{ units} \rightarrow 6321$$

$$1 \text{ unit} \rightarrow 2107$$

So, original number
 $= 8 \times 2107 = 16,856$

3. If $16\frac{2}{3}\%$ of a number is added with itself then result becomes 4956. Find the original number.

Sol. Let the original no. = x
 According to the question

$$x + x \times 16\frac{2}{3}\% = 4956$$

$$x + \frac{x}{6} = 4956$$

$$\frac{7x}{6} = 4956$$

$$x = 708 \times 6 = 4248$$

Alternate:

$$16\frac{2}{3}\% = \frac{1}{6} \rightarrow \text{Original number}$$

Now,

$$\text{New No} = 6 + 1 = 7 \text{ unit} = 4956$$

$$1 \text{ unit} = 708$$

$$\text{Original no.} = 6 \text{ unit} = 6 \times 708 = 4248$$

4. If $6\frac{2}{3}\%$ of a number is subtracted from itself then result becomes 5670. Find the original number.

Sol.

$$6\frac{2}{3}\% = \frac{1}{15} \rightarrow \text{Subtract value}$$

$$\rightarrow \text{Original number}$$

$$\text{New Value} = 15 - 1 = 14 \text{ unit} = 5670$$

$$1 \text{ unit} = 405$$

$$\text{Original value} = 405 \times 16 = 6480$$

5. If $11\frac{1}{9}\%$ of a number is added with itself then result becomes 900 find the original number.

$$\text{Sol. } +11\frac{1}{9}\% = \frac{1}{9} \rightarrow \text{Added value}$$

$$\rightarrow \text{Original number}$$

$$\text{New value} = 9 + 1 = 10 \text{ unit} = 900$$

$$1 \text{ unit} = 90$$

$$\text{Original no.} = 90 \times 9 = 810$$

6. What is 20% of 50% of 75% of 70?

$$\text{Sol. Value} = 70 \times \frac{1}{5} \times \frac{1}{2} \times \frac{3}{4} = \frac{21}{4} = 5.25$$

7. If 20% of $(P + Q) = 40\%$ of $(P - Q)$ then find $P : Q$

$$\text{Sol. } \frac{20}{100} (P + Q) = \frac{40}{100} (P - Q)$$

$$P + Q = 2P - 2Q$$

$$P - Q = 4P - Q$$

$$3Q = 1P$$

$$P : Q = 3 : 1$$

8. What is 20% of 25% of 300 ?

$$\text{Sol. } 300 \times \frac{20}{100} \times \frac{25}{100} = 15$$

9. 25% of what number is 36 ?

Sol. Let the number be x

$$\text{then } x \times \frac{25}{100} = 36$$

$$x = 36 \times 4 = 144$$

10. If 240 is 20% of a number, then 120% of that number will be ?

sol. Let the number be = x

$$20\% \text{ of } x = 240$$

$$x \times \frac{1}{5} = 240$$

$$x = 1200$$

Now,

$$1200 \times 120\% = 1200 \times \frac{120}{100} = 1440$$

11. If we express $41\frac{3}{17}\%$ as a fraction, then it is equal to :

$$\text{Sol. } 41\frac{3}{17}\% = \frac{700}{17} \times \frac{1}{100} = \frac{7}{17}$$

12. If 125% of x is 100, then x is:

$$\text{Sol. } x \times \frac{125}{100} = 100$$

$$x = \frac{100 \times 100}{125} = 80$$

13. If 50% of $(x - y) = 30\%$ of $(x + y)$ then what percent is y of x ?

$$\text{Sol. } \frac{50}{100} (x - y) = \frac{30}{100} (x + y)$$

$$50x - 50y = 30x + 30y$$



$$50x - 30x = 30y + 50y$$

$$20x = 80y$$

$$x = 4$$

$$y = 1$$

$$\text{So, } y \text{ is } \frac{1}{4} = 25\%$$

- 14.** If 64 is added in a number then number becomes $157\frac{1}{7}\%$ of itself. Find the number.

Sol. $157\frac{1}{7}\% = \frac{11}{7}$

$$\left[7 \times 157\frac{1}{7}\% = 11 \right]$$

$$\begin{array}{cc} 7 \text{ unit} & 11 \text{ unit} \end{array}$$

$$4 \text{ unit} \rightarrow 64$$

$$1 \text{ unit} \rightarrow 16$$

$$\text{So, the original number} = 7 \times 16 = 112$$

- 15.** If 930 is added in a number then number becomes $444\frac{4}{9}\%$ of itself. Find the original number.

Sol. $444\frac{4}{9}\% = \frac{40}{9}$

$$\begin{aligned} 444\frac{4}{9}\% &= 400\% + 44\frac{4}{9}\% \\ &= 4 + \frac{4}{9} = \frac{40}{9} \\ \text{and } 9 \times 444\frac{4}{9}\% &= 40 \end{aligned}$$

$$\begin{array}{cc} \text{Original number} & \text{Formed number} \\ 9 \text{ unit} & 40 \text{ unit} \end{array}$$

$$+ 31 \text{ unit} \rightarrow 930$$

$$1 \text{ unit} \rightarrow 30$$

$$\text{So, the original number} = 9 \times 30 = 270$$

- 16.** The price of a commodity rise from ₹ 6 per kg to ₹ 7.50 per kg. If the expenditure cannot increase the percentage of reduction in consumption is

Sol. Percentage increase

$$= \frac{7.50 - 6}{6} \times 100 = 25\%$$

$$100 \xrightarrow{+25\%} 125$$

$\therefore$ Percentage decrease in consumption

$$= \frac{25}{125} \times 100 = 20\%$$

- 17.** If the length of a rectangle is increased by $37\frac{1}{2}\%$ and its breadth is decreased by 20%. Find the % change in the area.

Sol. $\begin{array}{ccc} \text{Length} & \times & \text{Breadth} = \text{Area} \\ 8 & \times & 5 = 40 \\ 11 & \times & 4 = 44 \end{array} +4$

$$\left[37\frac{1}{2}\% = \frac{3}{8} \right] \quad \left[20\% = \frac{1}{5} \right]$$

$$\begin{aligned} \% \text{ change in Area} &= \frac{4}{40} \times 100 \\ &= 10\% \end{aligned}$$

- 18.** If the sides of a square is increased by 40%. Find the % change in its area.

Sol.

$$\begin{array}{ccc} \text{Side} & & \text{Area} \\ 5 & & (\text{Side})^2 \\ 7 & & 25 \end{array} \xrightarrow{+24} 49$$

$$\left[40\% = \frac{2}{5} \right]$$

$$\% \text{ change in Area} = \frac{24}{25} \times 100 = 96\%$$

- 19.** The price of sugar is increased by $16\frac{2}{3}\%$ and; the consumption of a family is decreased by 20%. Find the % change in his expenditure.

Sol.

$$\begin{array}{ccc} \text{Price} & \text{Consumption} & \text{Expenditure} \\ 6 \times 5 & = & 30 \\ \left[16\frac{2}{3}\% = \frac{1}{6} \right] & & \\ 7 \times 4 & = & 28 \end{array} \xrightarrow{-2}$$

% change in his expenditure

$$= \frac{2}{30} \times 100 = 6\frac{2}{3}\%$$

- 20.** The sale of a cinema ticket is increased by $57\frac{1}{7}\%$ and the price of ticket is increased by $16\frac{2}{3}\%$. Find the % change in his revenue.

Sol. $\begin{array}{ccc} \text{Sale} & \times & \text{Price} \\ 7 & \times & 6 = 42 \\ 11 & \times & 7 = 77 \end{array} \xrightarrow{+35}$

$$57\frac{1}{7}\% = \frac{4}{7}, \quad 16\frac{2}{3}\% = \frac{1}{6}$$

% Change in his revenue

$$\Rightarrow \frac{35}{42} \times 100 \Rightarrow 83\frac{1}{3}\%$$

- 21.** If one of the sides of a rectangle is increased by 20% and the other is increased by 5%. Find the percent value by which the area changes.

Sol. Area of rectangle = Length $\times$ Breadth

$$\text{Length} + 20\% = \frac{1}{5}$$

$$\text{Breadth} + 5\% = \frac{1}{20}$$

$$\begin{array}{ccc} \text{L} & \text{B} & \text{Area} \\ 5 \times 20 & = & 100 \\ 6 \times 21 & = & 126 \end{array} \xrightarrow{26}$$

$$\text{Required}\% = \frac{26}{100} \times 100$$

$$= 26\% \uparrow (\text{Increase})$$

- 22.** If one of the sides of rectangle increased by $37\frac{1}{2}\%$ and the other is decreased by 20% find the percent value by which area changes.



Sol. Area = Length $\times$ Breadth

$$\text{Length} = +37\frac{1}{2}\% = \frac{3}{8}$$

$$\text{Breadth} = -20\% = \frac{1}{5}$$

L	B	Area
8	$\times$ 5	= 40
11	$\times$ 4	= 44

4

$$\text{Required \%} = \frac{4}{40} \times 100 = 10\% \uparrow$$

(Increase)

- 23.** A number is first reduced by 20% and then it is increased by 80%. What was the net effect?

Sol. $-20\% = -\frac{1}{5}$, 5 4

$+80\% = +\frac{4}{5}$, $\frac{5}{25}$ $\frac{9}{36}$

+11

$$\text{Required \%} = \frac{11}{25} \times 100$$

= 44% (Increase)

- 24.** The tax imposed on an article is increased by 10% and its consumption decreased by 10%. Find the percentage change in revenue from it.

Sol. I $+10\% = \frac{1}{10}$, 10 11

II $-10\% = -\frac{1}{10}$, $\frac{10}{100}$ $\frac{9}{99}$

-1

$$\text{Required \%} = \frac{1}{100} \times 100$$

= 1% (decrease)

- 25.** Two numbers are respectively 20% and 50% more than a third. Now what percentage is the first of the second?

Sol. Let the third number be = 100

I	II	III
120	150	100

$$\text{Then, } \frac{120}{150} \times 100 = 80\%$$

- 26.** Two numbers are respectively 25% and 20% less than a third number. What percent is the first number of the second?

Sol. Let the third number is 100

I	II	III
75	80	100

$$\text{Required \%} = \frac{75}{80} \times 100 = 93\frac{3}{4}\%$$

- 27.** If Goutam's height is 10% more than Seema's height, by how much percent is Seema's height less than of Goutam's?

Sol. Required \% = $\frac{10}{(100+10)} \times 100$

$$= \frac{1000}{110} = \frac{100}{11} = 9\frac{1}{11}\%$$

Alternate:-

Seema's 100

↓ +10

Goutam's 110

$$\text{Required \%} = \frac{10}{110} \times 100$$

$$= 9\frac{1}{11}\%$$

- 28.** Two numbers are respectively 30% and 40% more than a third number. What percentage is the first of the second?

Sol. Let third number is 100.

Then,

I	II	III
130	140	100

$$\text{Required \%} = \frac{130}{140} \times 100 = 92\frac{6}{7}\%$$

- 29.** Two numbers are respectively 20% and 50% less than a third number. What percentage is the first of the second?

Sol. Let third number is 100

I	II	III
80	50	100

$$\text{Required \%} = \frac{80}{50} \times 100 = 160\%$$

- 30.** In a library, 30% of the books are in Hindi. 40% of the remaining are in French and 60% of the remaining are in Spanish. The remaining 8400 books are in English languages. What is the total number of books in library?

Sol. Let the total no. of books = x then,

$$\Rightarrow x \times \left(\frac{100-30}{100} \right) \times \left(\frac{100-40}{100} \right) \times \left(\frac{100-60}{100} \right) = 8400$$

$$\Rightarrow x \times \frac{70}{100} \times \frac{60}{100} \times \frac{40}{100} = 8400$$

$$x = 50,000$$

So, the total no. of books = 50,000

Alternate:-

		Total	Remaining
Hindi	$\rightarrow 30\% = \frac{30}{100} = \frac{3}{10}$	10	7
French	$\rightarrow 40\% = \frac{40}{100} = \frac{2}{5}$	5	3
Spanish	$\rightarrow 60\% = \frac{60}{100} = \frac{3}{5}$	5	1
		125	21
		$\downarrow \times 400$	$\downarrow \times 400$
		50,000	8400

So, the total no. of books = 50,000

- 31.** The price of rice is increased by 40%. If the expenditure on rice has to be kept the same as earlier. Find the ratio between the reduction in consumption and the original consumption?

Sol. $40\% = \frac{40}{100} = \frac{2}{5}$

Initial Price	Final Price
5	7

Cons. 7 $\xrightarrow{-2}$ 5

$$\text{Required ratio} = \frac{\text{Reduction}}{\text{Initial}}$$

$$= 2 : 7$$

Alternate:-

Let the initial expenditure = 100

-40% $\swarrow$ 100 $\searrow +40\%$ Vikas Kumar

140

$$\text{Required ratio} = 40 : 140$$

$$= 2 : 7$$



- 32.** One third of a number is 82.
What will 80% of that number be?

Sol. Let the number = x

$$\frac{1}{3} \times x = 82$$

$$x = 246$$

Required answer

$$= \frac{80}{100} \times 246 = 196.80$$

- 33.** A reduction in the Price of apples enables a person to purchase 3 apples for Rs. 1 instead of Rs. 1.25. What in the % of reduction in Price (approx.)?

Sol. Apple Rs.
3 1.25 (Before)
3 1 (Now)

$$\text{Reduction rate} = 1.25 - 1 = .25$$

$$\% \text{ Decrease} = \frac{.25}{1.25} \times 100 = 20\%$$

- 34.** The ratio of the number of males to that of females in a village is 3 : 2. If 30% of males and 70% of females are educated the ratio of the number of persons educated to uneducated.

Sol. Let the total no. of persons = 100

$$\text{Ratio of } \frac{\text{Males}}{\text{Females}} = \frac{3}{2}$$

$$5 \text{ units} = 100$$

$$1 \text{ unit} = 20$$

$$3 \text{ units} = 20 \times 3 = 60$$

$$2 \text{ units} = 20 \times 2 = 40$$

Males Females

$$60 + 40 = 100$$

$$\downarrow 30\% \quad \downarrow 70\%$$

$$\text{Educated } 18 + 28 = 46$$

$$\text{Uneducated} = 100 - 46 = 54$$

$$\text{Educated} : \text{Uneducated}$$

$$46 : 54$$

$$23 : 27$$

- 35.** The ratio of the no. of boys and girls in a college is 2 : 3. If 25% of the boys and 30% of the girls are scholarship holders, the percentage of the college students who are not scholarship holders is.

Sol. In such type of question assume data as per your need.

	Boys	Girls	
Ratio of numbers	→ 200	+ 300	= 500
	↓ +75%	↓ +70%	
Not holding Scholarship	→ 150	+ 210	= 360

$$\text{Required}\% = \frac{360}{500} \times 100 = 72\%$$

- 36.** In a class, the number of girls is 20% more than that of the boys. The strength of the class is 66. If 4 more girls are admitted to the class. The ratio of the no. of boys to that of the girls is.

Sol. $20\% = \frac{1}{5} = \frac{6}{5} \rightarrow \text{Girls}$
 $\frac{6}{5} \rightarrow \text{Boys}$

Boys : Girls

$$5 : 6$$

According to question,

$$5 + 6 \text{ units} = 66$$

$$11 \text{ units} = 66$$

$$1 \text{ unit} = 6$$

$$\text{Hence, Boys} = 6 \times 5 = 30$$

$$\text{Girls} = 6 \times 6 = 36$$

The no. of Girls when 4 is admitted = $(36+4) = 40$

$$\text{Required ratio} = 30 : 40 = 3 : 4$$

- 37.** The ratio of the number of boys to that of girls in a school is 4 : 1. If 75% of the boys and 70% of the girls are scholarship holders, then the percentage of students who do not get scholarship is.

Sol. Let the no. of boys = 400

Let the no. of girls = 100

Total no. of students who do not go scholarship

$$= 400 \times \frac{25}{100}, 100 \times \frac{30}{100}$$

$$= 100 + 30 = 130$$

$$\text{Required}\% = \frac{130}{500} \times 100 = 26\%$$

- 38.** If 15% of x is same as 20% of y then $x : y$ is

Sol. According to the question,

$$\frac{15}{100}x = \frac{20}{100}y$$

$$15x = 20y$$

$$\frac{x}{y} = \frac{20}{15} = \frac{4}{3}$$

$$x : y = 4 : 3$$

- 39.** Two numbers A and B are such that the sum of 5% of A and 4% of B is $\frac{2}{3}$ rd of the sum of 6% of A and 8% of B. The ratio A : B is.

Sol. According to the question,

$$\frac{5}{100}A + \frac{4}{100}B = \frac{2}{3} \left[\frac{6A}{100} + \frac{8B}{100} \right]$$

$$5A + 4B = \frac{2}{3} (6A + 8B)$$

$$15A + 12B = 12A + 16B$$

$$3A = 4B$$

$$\frac{A}{B} = \frac{4}{3}, \quad A : B = 4 : 3$$

- 40.** In an examination A got marks 10% less than B. B got marks 25% more than C, C got marks 20% less than D. If A got 360 marks out of 500 then D got marks:

Sol. Let the marks obtained by B = 100
According to the question

	A	B	C	D
	90	100	80	100
Ratio of marks	9	10	8	10
	↓ ×40		↓ ×40	
	360		400	

$$\% \text{ of D's marks} = \frac{400}{500} \times 100 = 80\%$$

- 41.** In an exam 900 girls and 1100 boys appeared. In which 40% of girls and 50% of the boys passed the exam. Find the % of failed students?

Sol. Girls failed = $100 - 40 = 60\%$
 Boys failed = $100 - 50 = 50\%$
 Total failed students

$$= \frac{3}{5} \times 900 + \frac{1}{2} \times 1100$$



$$= 540 + 550 = 1090$$

$$\text{Required}\% = \frac{1090}{2000} \times 100 = 54.5\%$$

- 42.** In an examination there are three subjects Biology, Botany, zoology having max. marks 120, 140, 100 respectively. A student gets 40%, 55%, 45% in Biology Botany, zoology respectively. If he wants to get 60% marks in four subjects then how many marks he must obtain in maths of max. marks 180?

Sol. Total max. marks in four subjects

$$120 + 140 + 100 + 180 = 540$$

60% of total max. marks

$$= \frac{3}{5} \times 540 = 324$$

marks obtained in three subjects

$$= 120 \times \frac{2}{5} + 140 \times \frac{11}{20} + 100 \times \frac{9}{20}$$

$$= 48 + 77 + 45 = 170$$

marks to be obtained in maths

$$= 324 - 170 = 154$$

- 43.** The ratio of the number of the males and females in a village is 3 : 2. If 20% males and 25% of females are uneducated the percentage of those who are educated?

Sol. Let's number of males = 300
Number of females = 200

Males Females

$$\begin{array}{cc} 300 & 200 \\ \downarrow 80\% & \downarrow 75\% \end{array}$$

$$\text{Educated} \rightarrow 240 + 150 = 390$$

Required%

$$= \frac{390}{(300 + 200)} \times 100$$

$$= \frac{390}{500} \times 100$$

$$= 78\%$$

- 44.** If 70% of the students in a school are boys and the number of girls is 540, how many boys are in the school?

Sol. 30% of girls students = 540

$$1\% = 18$$

70% of boys students

$$= 70 \times 18 = 1260$$

- 45.** A batsman scored 130 runs which included 5 fours and 5 sixes. What percent of his total score did he make by running between the wickets?

Sol. The batsman scored $5 \times 4 + 5 \times 6 = 50$ runs by fours and sixes respectively. Then runs scored by running.

$$= 130 - 50 = 80$$

Required percentage

$$= \frac{80}{130} \times 100 = 61\frac{7}{13}\%$$

- 46.** The Cost of manufacturing of an article as made up of four components A, B, C and D which have a ratio of 3:4:5:6 respectively. If there are respective changes in the cost of +10%, -20%, -30% and +40%, then what would be the percentage change in the cost.

Sol. NOTE- In such type of questions assume any value but ratio should not be changed.

	A	B	C	D
Old Cost	300	400	500	600
	$\downarrow +10\%$	$\downarrow -20\%$	$\downarrow -30\%$	$\downarrow +40\%$
New Cost	330	320	350	840

$$\text{Total old cost} = (300 + 400 + 500 + 600) = \text{Rs. } 1800$$

$$\text{Total new cost} = (330 + 320 + 350 + 840) = \text{Rs. } 1840$$

$$\% \text{ change} = \frac{1840 - 1800}{1800} \times 100$$

$$= \frac{40}{18} = 2\frac{2}{9}\%$$

- 47.** Goutam invests Rs. 10,000 in some shares in the ratio 2:3:5 which pay dividends of 10%, 25% and 20% (on his investment) for that year respectively. Find the dividend income.

Sol. Ratio of shares = $2x : 3x : 5x$

According to question,

$$(2x + 3x + 5x) = 10,000$$

$$10x = 10,000$$

$$\text{I}^{\text{st}} \text{ share} = 2 \times 1000 = 2000$$

$$\text{II}^{\text{nd}} \text{ share} = 3 \times 1000 = 3000$$

$$\text{III}^{\text{rd}} \text{ share} = 5 \times 1000 = 5000$$

Dividend income

$$= \frac{2000 \times 10}{100} + \frac{3000 \times 25}{100}$$

$$+ \frac{5000 \times 20}{100}$$

$$= 200 + 750 + 1000 = \text{Rs. } 1950$$

- 48.** The radius of a sphere is 20 cm. Find out its surface area is how much % of its volume?

Sol. S. A = $4\pi r^2$

$$\text{Volume} = \frac{4}{3}\pi r^3$$

Required percentage

$$= \frac{4\pi r^2}{\frac{4}{3}\pi r^3} \times 100 = \frac{3}{r} \times 100$$

$$= \frac{3}{20} \times 100 = 15\%$$

$\therefore$ The required percentage = 15%

- 49.** In a village there are 700 males, 500 females and 800 children. If due to epidemic 20% males, 40% females and 10% children are died. Find the % age of safe population of the village.

Sol. No. of safe males:

$$= \frac{80}{100} \times 700 = 560$$

No. of safe females

$$= \frac{60}{100} \times 500 = 300$$

No. of safe children

$$= \frac{90}{100} \times 800 = 720$$

Total safe population

$$= 560 + 300 + 720 = 1580$$

Required %

$$= \frac{1580}{(700 + 500 + 800)} \times 100$$

$$= \frac{1580}{2000} \times 100 = 79\%$$



- 50.** The price of a table and chair is Rs. 200 and Rs. 140 respectively. If the price of table and chair is increased by 20% and 30% respectively. Find the net value/price of two dozen tables and 25 chairs.

Sol. Increased price of table

$$= 200 \times \frac{120}{100} = \text{Rs. } 240$$

Increased prices of chair

$$= 140 \times \frac{130}{100} = \text{Rs. } 182$$

So value of 24 tables + 25 chairs
 $= 24 \times 240 + 25 \times 182$
 $= \text{Rs. } 10310.$

- 51.** If the numerator of a fraction is increased by 20% and the denominator is decreased by 5% the value of the new fraction

becomes $\frac{5}{2}$. The original fraction is.

Sol. Let the fraction = $\frac{x}{y}$

According to the question,

$$\Rightarrow \frac{x \times 120}{y \times 95} = \frac{5}{2}$$

$$\Rightarrow \frac{x}{y} = \frac{5 \times 95}{2 \times 120} = \frac{95}{48}$$

- 52.** A fruit seller had some oranges. He sells 60% oranges and still has 280 oranges. Originally he had.

Sol. Required Oranges,

$$= \frac{280}{(100 - 60)} \times 100$$

$$= \frac{280}{40} \times 100 = \text{700 Oranges}$$

- 53.** A dozen pairs of socks quoted at Rs. 180 are available at discount of 20%. How many pairs of socks can be bought for Rs. 48?

Sol. Price after discount

$$= \frac{180 \times 80}{100} = 144$$

Price of 1 pair of socks

$$= \text{Rs. } \frac{144}{12} = 12$$

$$\text{Required answer} = \frac{48}{12}$$

= 4 pairs

- 54.** 33% of employees pay tax in the year 2015. Non tax paying employees are 20100. The total number of employees are.

Sol. Total no. of employees

$$= \frac{20100}{(100 - 33)} \times 100$$

$$= \frac{20100}{67} \times 100 = 30,000$$

- 55.** A box has 1000 blue, 500 red balls, 500 black balls 25% of blue balls and 50% of red balls are taken away, then find the percentage of black balls ?

Sol.

	Blue	Red	Black
Total balls	1000	500	500
	↓ 25%	↓ 50%	
Takenout	250	250	

Remaining balls

$$= (1000 + 500 + 500) - (250 + 250)$$

$$= 1500$$

Required % of black balls

$$= \frac{500}{1500} \times 100 = 33\frac{1}{3}\%$$

- 56.** The sum of two numbers is 520. If the bigger number is decreased by 4% and the smaller number is increased by 12% then the numbers obtained are equal. Find the numbers.

Sol. Let the bigger number is a and the smaller number is (520 - a)

According to the question,

$$a \times \frac{(100 - 4)}{100}$$

$$= (520 - a) \times \left(\frac{100 + 12}{100} \right)$$

$$\frac{96a}{100} = (520 - a) \frac{112}{100}$$

$$96a = (520 - a)112$$

$$13a = 3640, a = 280$$

Hence the bigger number = 280

smaller number = (520 - 280) = 240

Alternate:-

Let the Bigger no. = x

smaller no = y

According to question,

$$x \times \frac{96}{100} = y \times \frac{112}{100}$$

$$6x = 7y$$

$$x : y$$

$$7 : 6$$

$$13 \text{ units} = 520$$

$$1 \text{ unit} = 40$$

$$\text{Bigger no.} = (x) = 7 \text{ units}$$

$$= 7 \times 40 = 280$$

$$\text{smaller no. (y)} = 6 \text{ units}$$

$$= 6 \times 40 = 240$$

- 57.** If two successive years, 80 and 60 students of a school appeared at the final examination of which 60% and 80% passed respectively. The average rate of students passed (in percent) is.

Sol.

I year II year

Appeared Students	→ 80	60
	↓ 60%	↓ 80%
Passed Students	→ 48	48

Required % average rate

$$= \frac{(48 + 48)}{(80 + 60)} \times 100$$

$$= \frac{96}{140} \times 100 = \frac{960}{14} = 68\frac{4}{7}\%$$

- 58.** The population of a village is

30,000. $\frac{1}{6}$ th are females and the

rest are males, 5% males and 40% of females are uneducated. What percentage of the whole village are educated?

Sol. No. of females = $30000 \times \frac{1}{6}$

$$= 5000$$

$$\text{No. of males} = 30,000 - 5000$$

$$= 25,000$$



No. of educated females

$$= 5000 \times \frac{60}{100} = 3000$$

No. of educated males

$$= 25000 \times \frac{95}{100} = 23750$$

Total educated population

$$= 23750 + 3000 = 26,750$$

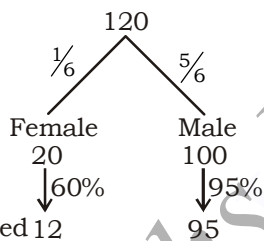
$$\text{Required \%} = \frac{26,750}{30,000} \times 100$$

$$= 89\frac{1}{6}\%$$

Alternate:

$$\frac{1}{6} \rightarrow \text{Female}, \frac{5}{6} \rightarrow \text{male}$$

Let the total no population = 120
(In this question no affect in total population when ask question in percentage)



Educated 12

95

$$\text{Total educated} = 12 + 95 = 107$$

$$\text{Required \%} = \frac{107 \times 100}{120}$$

$$= 89\frac{1}{6}\%$$

- 59.** The expense on Rice, Sugar and oil of a family are in the ratio 12 : 17 : 3. The price of these articles are increased by 20%, and 30% and 50% respectively. The total expenses of family on these articles are increased by.

Sol.

	Rice	Sugar	Oil
Old expenses	120	170	30
	↓ 20%	↓ 30%	↓ 50%
	24	51	15

Required %

$$= \frac{24 + 51 + 15}{(120 + 170 + 30)} \times 100$$

$$= \frac{90}{320} \times 100 = 28\frac{1}{8}\%$$

- 60.** Due to an increase of 50% in the price of eggs 4 eggs less are available for Rs 24. The present rate of eggs per dozen is.

Sol. Required more money when the price is increased by 50%

$$= 24 \times \frac{50}{100} = 12$$

$$\text{Present price} = \frac{12}{4} = 3 \text{ Rs./egg}$$

Present price of 1 dozen eggs

$$= 3 \times 12 = \text{Rs. } 36$$

- 61.** The sum of the numbers of boys and girls in a school is 300. If the number of boys is P. The number of girls becomes P% of the total number of students. The number of boys is.

Sol. No. of boys = P

$$\text{No. of girls} = (300 - P)$$

According to the question,

$$300 \times \frac{P}{100} = (300 - P)$$

$$3P = 300 - P$$

$$4P = 300$$

$$P = 75$$

No. of boys = 75

- 62.** In an exam, 1500 boys and 500 girls appeared 50% of the boys and 40% of the girls passed the examination. The percentage of candidates who failed.

Sol.

	Boys	Girls
	1500	500
	↓ 50%	↓ 60%
Failed Candidates →	750	300

Total failed candidates

$$= 750 + 300 = 1050$$

$$\text{Required \%} = \frac{1050}{(1500 + 500)} \times 100$$

$$= \frac{1050}{2000} \times 100 = 52.5\%$$

- 63.** 90% of the students in school passed in english, 85%. Passed in Hindi and 375 students passed in both the subjects. If no students failed in both the subjects find the total number of students ?

Sol. Percentage of passed students in both subjects

$$= (90 + 85) - 100 = 75\%$$

Total no. of students

$$= \frac{375}{75} \times 100 = 500$$

- 64.** Manisha spends $12\frac{1}{2}\%$ of her salary on item of daily use and 30% of the remainder on house rent. After that she is left with Rs. 4410. How much is her salary?

$$\text{Sol. } 12\frac{1}{2}\% = \frac{1}{8}, 30\% = \frac{3}{10}$$

Intital	Final
8	7
$\times 10$	$\times 7$
$\frac{80}{80}$	$\frac{49}{49}$
↓ 90	↓ 90
7200	4410

Hence required salary 7200

- 65.** Three sets of 400, 500 and 600 students appeared for an examination and the pass percentage was 100, 90 and 80 respectively. The pass percentage of the whole set is.

Sol.

	I	II	III
Appeared students →	400	500	600
	↓ 100%	↓ 90%	↓ 80%
Pass Students →	400	450	480

$$\text{Required \%} = \frac{400 + 450 + 480}{400 + 500 + 600} \times 100$$

$$= \frac{1330}{1500} \times 100 = 88\frac{2}{3}\%$$



- 66.** A man had a certain amount with him. He spent 30% of that to buy an article and 10% of the remaining on transport, then he donated Rs. 60. If he is left with 1200. The amount he spent on transport is :

Sol. Let the total amount = x
According to the question,

$$x \times \frac{70}{100} \times \frac{90}{100} = (60 + 1200)$$

$$x \times \frac{7}{10} \times \frac{9}{10} = 1260$$

Total amount = 2000

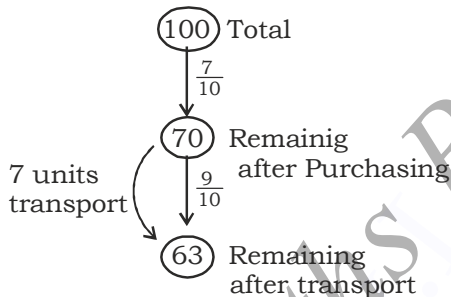
Amount spent on transport

$$= 2000 \times \frac{70}{100} \times \frac{10}{100} = 140$$

Alternate:-

$$30\% = \frac{3}{10}, \quad 10\% = \frac{1}{10}$$

Total amount = 100 units



$$\frac{10}{100} \times \frac{7}{63} \times \frac{1200}{60} = \frac{1260}{1260}$$

$$1 \text{ unit} = 20$$

$$7 \text{ units} = 20 \times 7 = 140$$

- 67.** Amit had a certain amount with him. He spent 20% of that to buy a car and 5% of the remaining on maintenance of a bike. Then he gifted 120 Rs. If he is left with Rs. 1400. Then find the total amount ?

Sol. Let the total amount = x
According to the question.

$$x \times \frac{80}{100} \times \frac{95}{100} = (120 + 1400)$$

$$x \times \frac{4}{5} \times \frac{19}{20} = 1520$$

$$x = \text{Rs. } 2000$$

Alternate:-

$$20\% = \frac{1}{5}, \quad 5\% = \frac{1}{20}$$

$$\begin{array}{r} 5 \quad 4 \quad 1400 \\ \times 20 \quad \times 19 \quad + 120 \\ \hline 100 \quad 76 \quad 1520 \\ \downarrow \times 20 \quad \times 20 \\ \text{Rs. } 2000 \end{array}$$

RY - IX

- 68.** A number is increased by $R\%$. To get back to the original number, It is to be reduced to Initial value by what % ?

Sol. $\frac{P \times R}{100} \rightarrow$ increased value

$$\rightarrow P + \frac{PR}{100} = P \left(\frac{100 + R}{100} \right)$$

Required answer

$$= \left(\frac{R}{100 + R} \times 100 \right) \% = \frac{100R}{100 + R} \%$$

- 69.** If Ram's salary is 30% less than that of shyam then how much percent is shyam's salary more than that of Ram

Sol. Shyam 100 unit
↓ -30 unit

Ram 70 unit

Ram - 70
Shyam - 100

$$\frac{30}{70} = \frac{3}{7}$$

$$42 \frac{6}{7} \% \quad \left[\because \frac{1}{7} = 14 \frac{2}{7} \% \right]$$

- 70.** If Sohan's salary is 25% more than that of mohan, then how much percent is mohan's salary less than that of sohan ?

Sol. Mohan 100
↓ +25
Sohan 125
Sohan 125
Mohan 100

$$\frac{25}{125} = \frac{1}{5} = 20\%$$

- 71.** The price of sugar rises by 20% by how much percentage should the consumption of sugar be reduced so that the expenditure doesn't change ?

Sol. Required percentage decrease

$$= \frac{\text{Increase}}{\text{Increase} + 100} \times 100$$

$$= \frac{20}{100 + 20} \times 100$$

$$= \frac{100}{6} = 16 \frac{2}{3} \%$$

Alternate:-

$$+20\% = \frac{+1}{5}$$

	Old	New
Price	5	6
Consumption	6	5

$$\text{Reduced \%} = \frac{1}{6} \times 100 = 16 \frac{2}{3} \%$$

- 72.** If food prices go up by 10% by how much should a man reduce his consumption so as not to increase his expenditure ?

Sol. Required answer

$$= \frac{10}{(100 + 10)} \times 100$$

$$= \frac{100}{11} = 9 \frac{1}{11} \%$$

Alternate:-

$$+10\% = \frac{+1}{10}$$

	Old	New
Price	10	11
Consumption	11	10

$$\text{Reduced \%} = \frac{1}{11} \times 100 = 9 \frac{1}{11} \%$$



- 73.** In the new budget, the price of kerosene oil rose by 25%. By how much percentage must a person reduce his consumption of kerosene oil so that his expenditure does not increase?

Sol. Required reduction in consumption

$$= \frac{x}{100+x} \times 100\%$$

where $x = 25$

$$= \frac{25}{100+25} \times 100 = 20\%$$

Alternate:-

$$+25\% = \frac{+1}{4}$$

	Old	New
Price	4	5
Consumption	5	4
		-1

$$\text{Reduced \%} = \frac{1}{5} \times 100 = 20\%$$

- 74.** The price of certain items is increased by 15%. If a consumer wants to keep his expenditure on the item the same as before, how much percent must he reduce his consumption of that item.

Sol. If the price of a commodity increases by $R\%$, then reduction in consumption, not to increase the expenditure is given by -

$$\left(\frac{R}{100+R} \times 100 \right) \% = \frac{15}{100+15} \times 100$$

$$= \frac{300}{23} = 13 \frac{1}{23} \%$$

Alternate:-

$$+15\% = \frac{+3}{20}$$

	Old	New
Price	20	23
Consumption	23	20
		-3

$$\text{Reduced \%} = \frac{3}{23} \times 100$$

$$= 13 \frac{1}{23} \%$$

- 75.** If the price of a commodity is increased by 50% by what fraction must its consumption be reduced so as to keep the same expenditure on its consumption?

Sol. Required fractional decrease

$$= \frac{R}{100+R} = \frac{50}{100+50} = \frac{1}{3}$$

- 76.** If the price of rice be raised by 25%, the percent by which a house-holder must reduce the consumption of rice so as not to increase his expenditure on rice is

Sol. Percentage decrease

$$= \frac{25}{125} \times 100 = 20\%$$

- 77.** If the duty of an article is reduced by 40% of its present rate, by how much percent must its consumption increase in order that the revenue remains unaltered?

Sol. Required increase percent

$$= \frac{40}{100-40} \times 100 = \frac{200}{3}$$

$$= 66 \frac{2}{3} \%$$

Alternate:-

$$-40\% = \frac{-2}{5}$$

	Old	New
Price	5	3
Consumption	3	5
		+2

$$\text{Increase \%} = \frac{2}{3} \times 100 = 66 \frac{2}{3} \%$$

- 78.** Price of a commodity has increased by 60%. By what percent must a consumer reduce the consumption of the commodity so as not to increase the expenditure?

Sol. If the reduction in consumption be $x\%$

$$\text{then } 60 - x - \frac{60x}{100} = 0$$

$$60 - x - \frac{3x}{5} = 0$$

$$300 - 5x - 3x = 0$$

$$8x = 300$$

$$x = \frac{300}{8} = 37.5\%$$

Alternate:-

$$+60\% = \frac{+3}{5}$$

	Old	New
Price	5	8
Consumption	8	5
		-3

$$\text{Reduced \%} = \frac{3}{8} \times 100 = 37.5\%$$

- 79.** The price of petrol is increased by 25%. By how much percent a car owner should reduce his consumption of petrol so that the expenditure doesn't change?

Sol. Required percent

$$= \frac{25 \times 100}{125} = 20\%$$

RY - X

- 80.** A number is increased by 20% and then it is decreased by 20%. Find the net increase or decrease percent?

Sol. Change in percentage

$$\left(20 - 20 - \frac{20 \times 20}{100} \right) \%$$

$$\left(\frac{-400}{100} \right) \% = -4\%, \text{ So } 4\% \text{ decrease}$$

$$\begin{matrix} (-ve = \text{Decrease}) \\ (+ve = \text{Increase}) \end{matrix}$$

Alternative

20% ↑	5	6
20% ↓	5	4
	25	24
		-1

$$-\frac{1}{25} \times 100 = -4\%$$

4% decrease



- 81.** A number is first decreased by 20%. The decreased number is then increased by 20%. The resulting number is less than the original number by 30. Find the original number ?

$$\text{Sol. } \left(-20 + 20 - \frac{20 \times 20}{100}\right) = -4\%$$

If the number be x then

$$4\% \text{ of } x = 30$$

$$x \times \frac{4}{100} = 30$$

$$x = 750$$

Alternative :

$$+20\% \quad -20\%$$

$$\begin{array}{r} 5 \quad 4 \\ \frac{5}{25} \quad \frac{6}{24} \\ \times 30 \quad \times 30 \\ \hline 750 \end{array}$$

So the original number 750

- 82.** If a number is increased by 20% and the resulting number is again increased by 20%, what percent is the total increase?

$$\text{Sol. } \begin{array}{r} 20\% \uparrow \rightarrow 5 \quad 6 \\ 20\% \uparrow \rightarrow 5 \quad 6 \\ \frac{5}{25} \quad \frac{6}{36} \\ \times 11 \\ \hline 11 \end{array}$$

$$\begin{aligned} \text{Required \%} &= \frac{11}{25} \times 100 \\ &= +44\% \text{ gain} \end{aligned}$$

- 83.** The price of an article is increased by 10% but the daily sale of the article is decreased by 10% the net effect on the daily sale receipts is?

$$\begin{array}{r} \text{Sol. } +10\% \quad -10\% \\ 10\% \uparrow \rightarrow 10 \quad 11 \\ 10\% \downarrow \rightarrow 10 \quad 9 \\ \frac{10}{100} \quad \frac{9}{99} \\ \times -1 \end{array}$$

$$\begin{aligned} \text{Required \%} &= \frac{1}{100} \times 100 \\ &= 1\% \text{ loss} \end{aligned}$$

- 84.** If price of a book is first decreased by 20% and then increased by 25% the next change in the price of the book will be.

$$\begin{aligned} \text{Sol. } -20\% &= \frac{1}{5}, \quad 5 \quad 4 \\ +25\% &= \frac{1}{4}, \quad \frac{4}{20} \quad \frac{5}{20} \end{aligned}$$

Required % = No change in the Price

- 85.** The price of an article was first increased by 20% and then again increased by 10%. If the last increased price is Rs. 99, the original price was.

$$\begin{aligned} \text{Sol. I } +20\% &= \frac{1}{5}, \quad 5 \quad 6 \\ \text{II } +10\% &= \frac{1}{10}, \quad \frac{10}{50} \quad \frac{11}{66} \\ &\quad \downarrow \times \frac{3}{2} \quad \downarrow \times \frac{3}{2} \\ &\quad (75) \quad 99 \end{aligned}$$

So, the original price is 75

- 86.** The price of a certain article was raised by 10% in India. The consumption of the same article was increased from 200 tons to 225 tons. By how much percent will the expenditure on the article rise in the Indian economy?

$$\begin{aligned} \text{Sol. \% Increase in consumption} &= \frac{225 - 200}{200} \times 100 = 12.5\% \\ \text{Now total rise in economy} &= 10 + 12.5 + \frac{10 \times 12.5}{100} = 23.75\% \end{aligned}$$

Alternate:

$$\begin{array}{r} \text{Let the price } 100 \\ \downarrow +10\% \\ 110 \\ \downarrow +12.5\% \\ 123.75 \end{array}$$

Final rise of economy = 23.75%

- 87.** If the length, breadth and height of a cube are decreased, Increased and increased by 5%, 5% and 20% respectively. then what will be the impact on the volume of the cube (in percent-ages terms)?

$$\text{Sol. } 5\% = \frac{1}{20}, 20\% = \frac{1}{5}$$

	Old	New
Length $\rightarrow$	20	19
Breath $\rightarrow$	20	21
Height $\rightarrow$	5	6
Volume	2000	2394
% change in volume	+394	

$$= \frac{394}{2000} \times 100 = \frac{394}{20} = 19.7\%$$

- 88.** While measuring the base of triangle it has been taken in 40% excess and its height was measured 40% less. Find the percentage change in its area?

Sol. Percentage change in area

$$= +40 - 40 - \frac{40 \times 40}{100} = -16\%$$

Hence there is a decrease of 16% in area.

Alternatively:

$$40\% = \frac{2}{5}$$

	Initial	Final
Base	5	7
Height	$\frac{5}{25}$	$\frac{3}{21}$

Percentage decrease

$$\begin{aligned} &= \frac{25 - 21}{25} \times 100 \\ &= 16\% \end{aligned}$$

- 89.** Ram pays 50% income tax on this tax he has to pay a surcharge of 20%. Thus, the net tax rate he has to pay is.

$$\begin{aligned} \text{Sol. Net tax rate} &= 50 + \frac{50 \times 20}{100} \\ &= 50 + 10 \\ &= 60\% \end{aligned}$$



90. Ankur pay 30% income tax on this tax he has to pay a surcharge of 10%. Thus the net tax rate he has to pay is.

Sol. Net Tax rate = $30 + \frac{30 \times 10}{100} = 33\%$

91. The price of an article was increased by P%. Later the new price was decreased by P%. If the latest price was Rs.1, then the original price was.

Sol. $P\% = \frac{P}{100}$

Initial Price	Final
100	$(100+P)$
100	$(100-P)$
10000	$(100+P)(100-P)$

According to the question,
 $(100 + P)(100 - P)$ units = Rs. 1
 $(10000 - P^2)$ units = Rs. 1

$$1 \text{ unit} = \frac{1}{10,000 - P^2}$$

$$\text{Original Prize} = \left(\frac{10000}{10000 - P^2} \right)$$

RY - XI

92. Mohan saves 14% of his salary while Sohan saves 22%. If both get the same salary and Sohan saves Rs. 1540, What is the savings of Mohan?

Sol. Salary of Sohan

$$= \frac{1540}{22} \times 100 = 7000$$

Salary of Mohan = Salary of Sohan

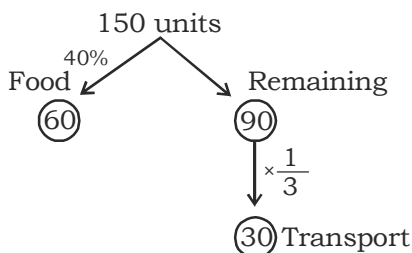
Hence salary of Mohan = 7000

Savings of Mohan

$$= 7000 \times \frac{14}{100} = 980$$

93. A man spends 40% of his monthly salary on food and one third of the remaining on transport. If he saves Rs.9000, then find his monthly salary?

Sol. Let total salary = 150 units



Remaining Salary after expenditure = $150 - (60 + 30)$
 $= 60$ units

According to the question,

$$60 \text{ units} \rightarrow 9000$$

$$1 \text{ unit} \rightarrow 150$$

$$\text{Monthly salary} = 150 \times 150 = \text{Rs. } 22,500$$

Alternate:-

Initial	Final
5	3
3	2
15	6 $\xrightarrow{\times 1500}$ 9000
$\downarrow \times 1500$	
22500	

94. A man spends $12\frac{1}{2}\%$ of his salary on item of daily use and 30% of the remainder on house rent. After that he is left with Rs. 2940. How much is his salary?

Sol. $12\frac{1}{2}\% = \frac{1}{8}, \quad 30\% = \frac{3}{10}$

Initial	Final
8	7
$\times \frac{10}{80}$	$\times \frac{7}{49}$
$\downarrow \times 60$	$\downarrow \times 60$
4800	2940

So required salary = 4800

95. If the total monthly income of 12 person is 72,000 and the income of one of them is 120% of the average income, then his income is.

Sol. Average income = $\frac{72,000}{12}$
 $= 6000$

Hence Required Income

$$= 6000 \times \frac{120}{100} = 7200$$

96. If the monthly salary of a employee is increased by $2\frac{2}{3}\%$, he gets 72 rupees more. His monthly salary is?

Sol. $2\frac{2}{3}\% = \frac{8}{3}\%$

Let the monthly salary = x

According to question,

$$x \times \frac{8}{3 \times 100} = 72$$

$$x = 2700$$

So, monthly salary = Rs. 2700

97. A man spends 75% of his income. His income increased by 20% and he increased his expenditure by $6\frac{2}{3}\%$. His savings will then be increased by.

Income	Exp.	Savings
100	75	25
$\downarrow +20\%$	$\downarrow +6\frac{2}{3}\%$	$\downarrow$
120	80	40

New saving = New Income - Expenditure
 $= 120 - 80 = 40$

$$\text{Required \%} = \frac{40 - 25}{25} \times 100$$

$$= 15 \times 4 = 60\%$$

98. A man spends 75% income. His income increased by 20% and his expenditure also increases by 10%. The percentage of increases in his savings is.

Income	Exp.	Savings
100	75	25
$\downarrow +20\%$	$\downarrow +10\%$	$\downarrow$
120	82.5	37.5

$$\text{Required \%} = \frac{37.5 - 25}{25} \times 100$$

$$= \frac{12.5}{25} \times 100 = 50\%$$



- 99.** A clerk received an annual salary of Rs. 3660 in the year 2015. This was 20% more than his salary in 2014. What was his salary in 2014?

Sol. $+20\% = \frac{1}{5}$

Year 2014	Year 2015
$\downarrow \times 610$	$\downarrow \times 610$
3050	3660

Hence required salary = 3050

- 100.** Ankur's salary is increased by 20% this year. If his present salary is Rs. 12,600, then find the last year salary?

Sol. Required last year salary

$$= \frac{12,600}{(100 + 20)} \times 100$$

$$= \frac{12,600}{120} \times 100 = 10,500$$

Alternate:-

$+20\% = \frac{1}{5}$	
$\downarrow \times 21,00$	$\downarrow \times 2100$
10500	12600

Required salary = 10,500

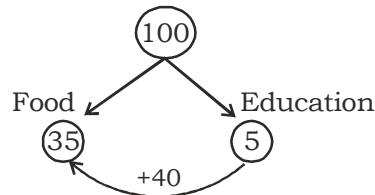
- 101.** Vipin spends 75% of his income and saves the rest of his income if his income increased by 40% and he increases his expenditure by 36%. Then the increase in savings.

Sol.	Income	Exp.	Savings
	100	75	25
	$\downarrow +40\%$	$\downarrow +36\%$	$\downarrow +13$
	140	102	38
	Required % = $\frac{38 - 25}{25} \times 100$		
	$= \frac{13}{25} \times 100 = 52\%$		

- 102.** Seema spends 35% of her salary on food and 5% of salary on children's education. In January 2016, she spent Rs. 17,600 on these two items. Her salary for that month is.

Sol. Let's total salary of Seema = 100 units

According to the question,



40 units = 17,600

1 unit = $\frac{17600}{40} = 440$

100 units = $440 \times 100 = 44,000$

- 103.** Out of his total income, Ankur spends 20% on house rent and 70% of the rest on house hold expenses. If he saves Rs. 7200 what is his total income?

Sol. $20\% = \frac{1}{5}$, $70\% = \frac{7}{10}$ → Expenditure

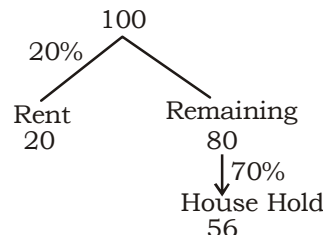
$70\% = \frac{7}{10}$ → Income

Initial	Final
5	4
$\times 10$	$\times 3$
$\frac{50}{50}$	$\frac{12}{12}$
$\downarrow \times 600$	$\downarrow \times 600$
30,000	7200

Hence Total Income = 30,000

Alternate:-

Let the total income = 100



Total expenditure = $20 + 56 = 76$

Saving = $100 - 76 = 24$ units

24 units → 7200

1 unit → 300

Then Total income

= $100 \times 300 = 30,000$

- 104.** The total income of A, B and C be Rs. 333. If they spend 80%, 85%, and 75% respectively and the ratio of their savings be 7:6:9. Then find the income of B.

Sol.

A B C

spend% → 80 75 75

saving% → 20 15 25

According to question,

20% of A = 7R

$A \times \frac{1}{5} = 7R$

A = 35R

15% of B = 6R

$B \times \frac{3}{20} = 6R$

B = 40R

25% of C = 9R

$C \times \frac{1}{4} = 9R$

C = 36R

Now,

$35R + 40R + 36R$

= 333

111R = 333

R = 3

Income of B = 40R

= $40 \times 3 = 120$

- 105.** Jony saves 30% of his monthly salary. If his monthly expenditure is Rs. 7000 then his monthly savings is.

Sol. Let the salary = 100 units

Savings = 30%

Savings = $100 \times \frac{30}{100}$

= 30 units

Expenditure = $100 - 30$

= 70 units

According to the question,

70 units = Rs. 7000

1 unit = Rs. 100

Saving 30 units = 100×30
= 3000

**RY - XII**

- 106.** A reduction of 20% in the Price of Rice enables a Purchase to obtain 8kg more Rice for Rs. 160. Then the Price Per kg before reduction was

Sol. Let the original Price of Rice be Rs. x Per kg
Reduced Price

$$\text{Rs. } \frac{80x}{100} = \text{Rs. } \frac{4x}{5} \text{ Per kg}$$

According to the question

$$\frac{160}{4x/5} - \frac{160}{x} = 8$$

$$\frac{40 \times 5}{x} - \frac{160}{x} = 8$$

$$\Rightarrow \frac{200}{x} - \frac{160}{x} = 8$$

$$\frac{40}{x} = 8 \Rightarrow x = \frac{40}{8} = 5 \text{ Per kg.}$$

Alternate:-

$$-20\% = \frac{1}{5}$$

	Initial	Final
Price	5	4

Consumption	4	5
		1

$$1 \text{ units} = 8$$

Now,

$$\text{Initial consumption} = 4 \text{ units} \\ = 4 \times 8 = 32 \text{ kg}$$

$$\text{Initial prize} = \frac{160}{32} = ₹ 5 \text{ kg}$$

- 107.** A reduction of 25% in the Price of sugar enables a person to buy 10 kg more sugar for Rs. 600. The reduced Per kg Price of Sugar is

Sol. Let the original Price of Sugar Per kg = x Rs.

New Price of Rice Per kg

$$= \frac{3x}{4} \text{ Rs.}$$

$$\frac{600}{3x/4} - \frac{600}{x} = 10$$

$$600 \left(\frac{4}{3x} - \frac{1}{x} \right) = 10$$

$$\Rightarrow 600 \left(\frac{4-3}{3x} \right) = 10$$

$$\frac{600}{3x} = 10 \Rightarrow x = \frac{600}{30} = \text{Rs. } 20$$

$$\text{New Price} = \frac{3x}{4} = \frac{3 \times 20}{4} \\ = 15 \text{ Rs/kg}$$

Alternate:-

$$-25\% = \frac{1}{4}$$

	Initial	Final
Price	4	3

Consumption	3	4
		1

$$1 \text{ unit} = 10$$

Now,

$$\text{Final consumption} = 4 \text{ units} \\ = 4 \times 10 = 40$$

$$\text{Final Price} = \frac{600}{40} = ₹ 15 \text{ kg}$$

- 108.** A reduction of 20% in the Price of an orange enables a man to buy 10 oranges more for Rs 54. The reduced Price of apples Per dozen is

Sol. Let the original Price of oranges be x Rs./dozen

$$\therefore \text{New Price} = \frac{4x}{5} / \text{dozen}$$

$$\frac{54}{4x} - \frac{54}{x} = \frac{10}{12}$$

$$54 \left(\frac{5}{4x} - \frac{1}{x} \right) = \frac{5}{6}$$

$$54 \left(\frac{5-4}{4x} \right) = \frac{5}{6} \Rightarrow \frac{54}{4x} = \frac{5}{6}$$

$$\Rightarrow 4x = \frac{54 \times 6}{5}$$

$$\therefore \frac{4x}{5} = \frac{54 \times 6}{5 \times 5} = \text{Rs. } 12.96$$

Alternate:-

$$-20\% = \frac{-1}{5}$$

	Original	New
Price	5	4

Quantity	4	5
		1

$$1 \text{ unit} = 10 \text{ orange} = \frac{10}{12} \text{ dozens}$$

$$1 \text{ unit} = \frac{5}{6} \text{ dozens}$$

$$\text{New quantity} = 5 \times \frac{5}{6}$$

$$= \frac{25}{6} \text{ dozens.}$$

$$\text{New price} = \frac{54}{\frac{25}{6}} = \frac{54 \times 6}{25} \\ = 12.96$$

- 109.** When the Price of Rice decreased by 10% of a man could by 1 kg more Rice for Rs. 270. Then the original Price of Rice Per kg is.

Sol. Let the original Price of Rice be Rs x /kg

$$\text{New Price} = \text{Rs. } \frac{9x}{10} / \text{kg}$$

$$\frac{270}{\frac{9x}{10}} - \frac{270}{x} = 1$$

$$\frac{300}{x} - \frac{270}{x} = 1$$

$$\Rightarrow \frac{30}{x} = 1$$

$$\Rightarrow x = 30 \text{ Rs/kg}$$

Alternate:-

$$-10\% = \frac{1}{10}$$

	Original	New
Price	10	9

Quantity	9	10
		+1

$$1 \text{ unit} = 1 \text{ kg}$$

Then,

$$\text{Original quantity} = 9 \text{ units} \\ = 9 \times 1 = 9 \text{ kg}$$

$$\text{original price} = \frac{270}{9}$$

$$= ₹ 30 \text{ kg}$$



RY - XIII

- 110.** A book consists of 30 pages, 25 lines on each page and 35 characters on each line. If this content is written in another book consisting of 30 lines and 28 characters per line, then the required no. of pages will how much percent greater than the previous pages?

Sol. Let no. of new pages be P_2 then,

$$30 \times 25 \times 35 = P_2 \times 30 \times 28$$

$$P_2 = \frac{125}{4} = 31.25$$

$\Rightarrow P_2 = 32$ pages (pages will always be integers)

so, required percentage

$$= \frac{2}{30} \times 100$$

$$= 6.66\%$$

- 111.** If the price of sugar is decreased by 20%, a person can buy 2kg more sugar from 360 rupees. Find the original and present price of sugar per kg.

Sol. $-20\% = \frac{1}{5}$

	Original	Present
Price	5	4

Quantity	4	5
----------	---	---

1 unit = 2kg

original quantity = 4 units

$$= 4 \times 2 = 8\text{kg}$$

Present quantity = 5 units

$$= 5 \times 2 = 10\text{kg}$$

$$\text{original price} = \frac{360}{8}$$

$$= ₹ 45 \text{ kg}$$

$$\text{present price} = \frac{360}{10}$$

$$= ₹ 36 \text{ kg}$$

- 112.** A man multiplied a no. by $\frac{7}{4}$

instead of $\frac{3}{5}$. Find the % change in revenue.

Sol. In such type of questions let a number which is exactly divisible of 5 and 4 means LCM of (5, 4) = 20

$$\begin{array}{r} \checkmark \quad \frac{3}{5} \times 20 = 12 \\ \times \quad \frac{7}{4} \times 20 = 35 \end{array} \quad \left. \vphantom{\begin{array}{r} \checkmark \quad \frac{3}{5} \times 20 = 12 \\ \times \quad \frac{7}{4} \times 20 = 35 \end{array}} \right\} +23$$

$$\text{Increase \%} = \frac{23}{12} \times 100 = 191\frac{2}{3}\%$$

- 113.** A student multiplied a number by $\frac{3}{5}$ instead of $\frac{5}{3}$. What is the % error in the calculation?

$$\begin{array}{r} \checkmark \quad \frac{5}{3} \times 15 = 25 \\ \times \quad \frac{3}{5} \times 15 = 9 \end{array} \quad \left. \vphantom{\begin{array}{r} \checkmark \quad \frac{5}{3} \times 15 = 25 \\ \times \quad \frac{3}{5} \times 15 = 9 \end{array}} \right\} -16$$

Let the number = (LCM of 5, 3) = 15

$$\% \text{ Error} = \frac{16}{25} \times 100 = 64\%$$

(Decrease)

- 114.** In an examination a students got 32% marks and failed by 4 marks. while an another students got 35% marks and got 5 marks more than pass marks find the maximum marks in the examination

Sol. Let the max marks be = x
According to question
(32% of x) + 4 = (35% of x) - 5
3% of x = 9

$$x \times \frac{3}{100} = 9$$

$$x = 9 \times \frac{100}{3}$$

$$\text{max marks} = 300$$

Alternative:-

$$\begin{array}{r} 32\% \quad -4 \\ 35\% \quad +5 \\ \hline 3\% \quad 9 \end{array}$$

$$3\% \rightarrow 9$$

$$1\% \rightarrow 3$$

$$100\% = 3 \times 100 = 300$$

$$\text{max. marks} = 300$$

- 115.** In an examination the first student got 28% marks and failed by 12 marks. While in the same examination the second students got 30% marks and failed by 6 marks find the maximum marks in the examination and also find minimum pass marks.

Sol. Let x be the max. marks
then pass marks =

$$(28\% \text{ of } x) + 12 = (30\% \text{ of } x) + 6$$

$$2\% \text{ of } x = 6$$

$$2 \times \frac{x}{100} = 6$$

$$\text{max. marks } (x) = \frac{6}{2} \times 100 = 300$$

$$\begin{aligned} \text{Pass marks} &= \frac{30}{100} \times 300 + 6 \\ &= 96 \end{aligned}$$

- 116.** The marks of Jony in chemistry are 60% of the marks in mathematics and marks in mathematics are 60% of the marks in physics. How many marks he got in Chemistry. If the marks in these three subjects are 147 in all?

Sol.

Chemistry : Maths	Maths: Physics
60 100	60 100

Chemistry : Maths	Maths: Physics
3 5	3 5

After combining the ratio

Chemistry Maths Physics

$$9x \quad 15x \quad 25x$$

According to the question

$$9x + 15x + 25x = 147$$

$$49x = 147$$

$$x = 3$$

$$\begin{aligned} \text{marks in chemistry} &= 9 \times 3 \\ &= 27 \end{aligned}$$



- 117.** In an exam a students got 32.2% marks and he was failed by 28 marks. While an another student got 45% marks and he passed getting 36 marks more than minimum marks required to pass. Find the minimum marks % required to pass in the exam?

Sol.

32.2%	-28	
45%	+36	
Diff. 12.8%	64	marks

$$\% = \frac{64}{12.8} = 5 \text{ marks}$$

$$\% \text{ marks} = 32.2 + \frac{28}{5}$$

$$= 32.2 + 5.6 = 37.8 \%$$

- 118.** Jony scores 80% in Geography and 66% in History and the max. marks of both the papers are 100. What percent does he score in maths which is of 200 marks. If he scores 80% marks in all the three subjects.

Sol. Marks in Geography = 80 out of 100
 Marks in History = 66 out of 100
 Marks obtained in all subject

$$= \frac{80}{100} \times 400 = 320$$

$$\text{So marks obtained in maths} = 320 - (80 + 66) = 174 \text{ out of } 200$$

$$\text{Required}\% = \frac{174}{200} \times 100 = 87\%$$

- 119.** A students has to secure 40% marks to pass the exam. if he gets 80 marks and fails by 40 marks. Than find the maximum marks set for the examination.

Sol. Passing% = 40%

he gets 80 marks and fails by 40,
 then 40% = 120 marks
 1% = 3 marks
 max. marks = 100%
 = $100 \times 3 = 300$

- 120.** A student has to secure 40% marks to get through. If he gets 40 marks and fails by 40 marks, then find the maximum marks set for the examination.

Sol. 40% is equal to = 40 + 40
 40% = 80
 1% = 2
 Max. marks = $2 \times 100 = 200$

- 121.** A candidate scores 25% and fails by 30 marks while another candidate who scores 50% marks gets 20 marks more than the minimum required marks to pass the examination. Find the maximum marks for the examination.

Sol. If he gets

25%	-30
50%	+20
25%	50

25% = 50
 1% = 2 marks

$$\text{passing}\% = 25\% + \frac{30}{2}\% = 40\%$$

Max. marks = 200

- 122.** When Ravi scores 53% and fails by 5 marks while Sandeep who scores 63% marks, gets 10 marks more than the minimum required marks to pass the examination. Find the passing percentage ?

Sol. Ravi

53%	-5
63%	+10
10%	15

$$10\% = 15$$

$$1\% = \frac{3}{2}$$

$$\text{Passing}\% = 53 + \frac{5}{3/2} = 56\frac{1}{3}\%$$

- 123.** A company give 12% commission to his salesman on total sales and 1% bonus on the sales over RS. 15000, If the salesman deposit Rs. 52,350 after deducting his earning from total sales. Find total sales.

Sol: Let the total sales = x

$$\text{Earning} \Rightarrow x \times \frac{12}{100} +$$

$$(x - 15000) \times \frac{1}{100}$$

$$\frac{12x}{100} + \frac{x}{100} - 150$$

$$\frac{13x}{100} - 150$$

ATQ Total sales - earning = 52,350

$$x - \left(\frac{13x}{100} - 150 \right) = 52,350$$

$$x - \frac{13}{100}x + 150 = 52350$$

$$\frac{87x}{100} = 52,200 \quad x = \text{Rs. } 60,000$$

Alternate:-

15000 ↓ 12%	+ ↓ 12% + 1%
-------------------	--------------------

Let 13% commission of total sales

$$\text{Then, earning} = 15000 \times \frac{1}{100} = 150$$

deposit Rs. after deducting earning

$$= 52,350 - 150 = 52,200$$

$$87\% \text{ of } x = 52,200$$

$$x \times \frac{87}{100} = 52,200$$

$$\text{Total sales } x = 60,000$$

**RY - XIV**

- 124.** If the annual increase in the population of a town is $6\frac{1}{4}\%$ and the present number of people is 4096. What will the population be in 3 years ?

Sol. $6\frac{1}{4}\% = \frac{1}{16}$

Successive increase

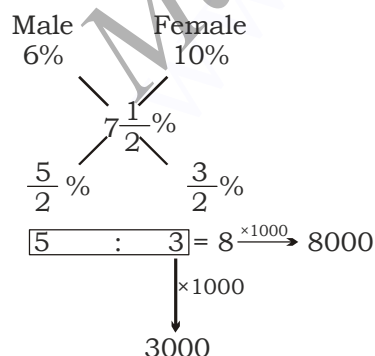
$$\begin{array}{r} 16 \quad 17 \\ 16 \quad 17 \\ \hline 16 \quad 17 \\ \hline 4096 \quad 4913 \end{array}$$

So, after 3 years the population will be 4913.

- 125.** The population of a village is 8000. If the males and females are increased by 6% and 10% respectively. Then population will become 8600. Find the number of females at present?

Sol. Increased Population = 8600
- 8000 = 600

$$\begin{aligned} \text{Increased}\% &= \frac{600}{8000} \times 100 \\ &= 7\frac{1}{2}\% \end{aligned}$$



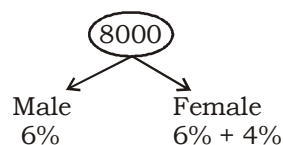
$$8 \text{ Units} = 8000$$

$$1 \text{ Unit} = 1000$$

$$3 \text{ Unit} = 3000$$

Therefore, number of Females = 3000

Alternate:-



$$\Rightarrow 8000 \times \frac{6}{100} = 480$$

$$\Rightarrow 8600 - 8000 = 600$$

$$\Rightarrow \text{Remaining} = 600 - 480 = 120$$

$$\Rightarrow 4\% \text{ of female} = 120$$

$$\Rightarrow \text{Females} \times \frac{4}{100} = 120$$

$$\text{Females} = 3000$$

$$\text{Males} = 5000$$

- 126.** The population of a town is 20,000. It increases by 20% during the first year. During the second year it decreases by 10% and increased by 30% during the third year. What will the population be after 3 years?

Sol. I II III
+20% -10% +30%

$$\begin{array}{r} +\frac{1}{5} \quad -\frac{1}{10} \quad +\frac{3}{10} \\ \text{Before} \quad \text{After} \\ \uparrow \quad \uparrow \\ 5 \quad 6 \\ 10 \quad 9 \\ 10 \quad 13 \\ \hline 500 \quad 702 \\ \downarrow \times 40 \quad \downarrow \times 40 \\ 20000 \quad 28,080 \end{array}$$

- 127.** The population of the mukherjee nagar is 10,000 at this moment. If increases by 10% in the first year, however in the second year, due to immigration the population drops by 5%. Find the population at the end of the third year. In in the third year the population increases by 20%.

- Sol.** The population of mukherjee nagar = 10,000

New population

$$\begin{aligned} &= 10,000 \times \frac{110}{100} \times \frac{95}{100} \times \frac{120}{100} \\ &= 12,540 \end{aligned}$$

Alternative:

I II III

$$+10\% \quad -5\% \quad +20\%$$

$$+\frac{1}{10} \quad -\frac{1}{20} \quad +\frac{1}{5}$$

Before	After
10	11
20	19
5	6
1000	1254
$\downarrow \times 10$	$\downarrow \times 10$
At present Population $\rightarrow 10,000$	12540

- 128.** The population of a village was 9600. In a year with the increase in population of males by 8% and that of females by 5%, the population of the village become 10272. What was the number of males in the village before increase ?

Sol.

9600

Male Female

5% + 3% 5%

$$= \frac{9600 \times 5}{100} = 480$$

Increase population

$$= 10272 - 9600$$

$$= 672$$

$$\text{Now, Remaining} = 672 - 480 = 192$$

Then,

$$3\% \text{ Female} = 192$$

$$\text{Male} \times \frac{3}{100} = 192$$

$$\text{Male} = 6400$$

$$\text{Female} = 9600 - 6400 = 3200$$

- 129.** If the population of a town is 64000 and its annual increase is 10% then its correct population at the end of 3 years will be.



Sol. $+10\% = \frac{1}{10}$

	Before	After
I st year $\rightarrow$	10	11
II nd year $\rightarrow$	10	11
III rd year $\rightarrow$	10	11
	<u>1000</u>	<u>1331</u>
	$\downarrow \times 64$	$\downarrow \times 64$
	64,000	85,184

So after 3 years the population will be 85,184

- 130.** The population of a village has increased annually at the rate of 25%. If at the end of 3 years it is 10,000, the population in the beginning of the first year was...

Sol. $+25\% = \frac{1}{4}$

I year $\rightarrow$	4	5
II year $\rightarrow$	4	5
III year $\rightarrow$	4	5
	<u>64</u>	<u>125</u>
	$\downarrow \times 80$	$\downarrow \times 80$
	5120	10,000

After 3 year population = 10,000

The population at the beginning of the first year was = 5120

- 131.** Present population of a village is 67600. It has been increasing annually at the rate of 4%. What was the population of the village two years ago?

Sol. $+4\% = \frac{1}{25}$

I year $\rightarrow$	25	26
II year $\rightarrow$	25	26
	<u>625</u>	<u>676</u>
	$\downarrow \times 100$	$\downarrow \times 100$
	62500	67600
		Present Population

So, the population of the village two years ago was 62,500.

- 132.** If the annual increase in the population of town be 4% and the present population be 17,576,?

Sol. $+4\% = \frac{1}{25}$

	Before	After
I year $\rightarrow$	25	26
II year $\rightarrow$	25	26
III year $\rightarrow$	25	26
	<u>15,625</u>	<u>17,576</u>
	$\downarrow \times 1$	$\downarrow \times 1$
	15,625	17,576
		Present Population

So, the population three years ago was 15625.

- 133.** The present population of a city is 1,80,000. If it increases at the rate of 10% per annum, its population after 2 years will be.

Sol. $10\% = \frac{1}{10}$

	Before	After
I year $\rightarrow$	10	11
II year $\rightarrow$	10	11
	<u>100</u>	<u>121</u>
	$\downarrow \times 1800$	$\downarrow \times 1800$
	1,80,000	2,17,800
		Current Population

So, after 2 year the population will be 2,17,800.

- 134.** The population of a town is 8000. It increases by 10% during the first year and by 20% during the second year. What is the population after two years?

Sol. I year, $+10\% = \frac{1}{10}$

II year, $+20\% = \frac{1}{5}$

	Before	After
I st year $\rightarrow$	10	11
II nd year $\rightarrow$	5	6
	<u>50</u>	<u>66</u>
	$\downarrow \times 160$	$\downarrow \times 160$
	8000	10,560

So, after two years the population will be 10,560.

- 135.** The population of a village is 25,000. One fifth of all are female and the rest are males. 5% of males and 40% of females are uneducated. What percentage on the whole are educated.

Sol. Total population = 25,000

$$\frac{1}{5} \text{ female} = \frac{1}{5} \times 25,000 = 5000$$

$$\text{Then males} = 20,000$$

$$5\% \text{ of } 20,000 \text{ males} = 1000$$

$$40\% \text{ of } 5000 \text{ female} = 2000$$

$$\text{So, the educated population} = \text{Total population} - \text{Uneducated}$$

$$= 25,000 - 3000 = 22,000$$

$$\text{So, the educated population is } 22,000$$

$$\text{Required \%} = \frac{22000}{25000} \times 100 = 88\%$$

- 136.** The population of town is 10,000. It increases by 10% during the first year. During the second year, it decrease by 20% and increased by 30% during the third year. What is population after 3 years ?

Sol. I II III
+10% -20% +30%

$$\frac{1}{10} \quad \frac{1}{5} \quad \frac{3}{10}$$

	Before	After
I st year $\rightarrow$	10	11
II nd year $\rightarrow$	5	4
III rd year $\rightarrow$	10	13
	<u>500</u>	<u>572</u>
	$\downarrow \times 20$	$\downarrow \times 20$
	10,000	11440

So, after 3 years population be 11440

- 137.** A district has 64,000 inhabitants. If the population increases

at the rate of $2\frac{1}{2}\%$ per annum,

the number of inhabitants at the end of 3 years will be.



Sol. $+2\frac{1}{2}\% = \frac{1}{40}$

	Before	After
I year	→ 40	41
II year	→ 40	41
III year	→ 40	41
	<u>64,000</u>	<u>68,921</u>
	↓ ×1	↓ ×1
	<u>64,000</u>	<u>68,921</u>

So, the number of inhabitants at the end of 3 years will be 68,921.

- 138.** The population of a town increased every year by 4%. If its present population is 50,000, then after 2 years it will be.

Sol. $4\% = \frac{1}{25}$

	Before	After
I year	→ 25	26
II year	→ 25	26
	<u>625</u>	<u>676</u>
	↓ ×80	↓ ×80
	<u>50,000</u>	<u>54,080</u>
	↓	
	Present Population	

So, after two year the population will be 54,080.

- 139.** The population of a town is 10,000. If the males increases by 5% and the female by 6%. The population will be 10540. How many females are there?

Sol.

10,000

Male 5%
Female 5% + 1%

5% of 10,000 = 500

Increase population = 10540 - 10000 = 540

Remaining = 540 - 500 = 40

1% of female = 40

Population of Female = 40 × 100 = 4000

Males = 6000

- 140.** The population of a town 2 years ago was 62,500. Due to migration to big cities, it decreases every year at the rate of 4%. The present population of town is.

Sol. $-4\% = \frac{1}{25}$

	Before	After
I year	→ 25	24
II year	→ 25	24
	<u>625</u>	<u>576</u>
	↓ ×100	↓ ×100
	<u>6,2500</u>	<u>5,7600</u>

The population two years ago = 62,500

So, the present population = 57600.

- 141.** The population of a town increases by 5% every year. If the present population is 9261, the population 3 years ago was.

Sol. $5\% = \frac{1}{20}$

	Before	After
I year	→ 20	21
II year	→ 20	21
III year	→ 20	21
	<u>8000</u>	<u>9261</u>
	↓ ×1	↓ ×1
	<u>8000</u>	<u>9261</u>

Present population = 9261

So, the population three years ago was 8000.

- 142.** The population of a village increases by 5% annually. If its present population is 4410, then its population 2 years ago was...

Sol. $5\% = \frac{1}{20}$

	Before	After
I year	→ 20	21
II year	→ 20	21
	<u>400</u>	<u>441</u>
	↓ ×10	↓ ×10
	<u>4000</u>	<u>4410</u>

Present population = 4410

So, Two years ago the population was 4,000.

- 143.** The population of a village decreases at the rate of 20% per annum. If its population 2 years ago was 10,000 the present population is...

Sol. $-20\% = \frac{1}{5}$

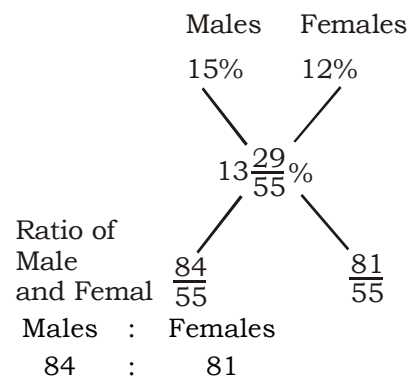
	I year	II year
	→ 5	→ 5
	<u>25</u>	<u>16</u>
	↓ ×400	↓ ×400
	<u>10,000</u>	<u>64,00</u>

So, The present population is 64,00.

- 144.** The population of a village is 5500. If no. of males are increased by 15% and no. of females are increased by 12% then population becomes 6244. find the difference between no. of males and females of that village.

Sol. We can do it by Alligation
% age change in total population

$$= \frac{6244 - 5500}{5500} \times 100 = 13\frac{29}{55}\%$$

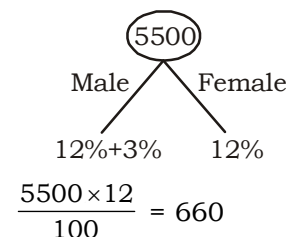


so difference between no. of males and females

$$= \frac{5500}{165} \times (84 - 81) = \frac{(5500)}{165} \times 3$$

$$= 100$$

Alternate:



Increase population = 6244 - 5500 = 744

Now, 744 - 660 = 84

3% males = 84



$$\text{Males} \times \frac{3}{100} = 84$$

$$\text{Males} = 2800$$

$$\text{Females} = 5500 - 2800 = 2700$$

$$\text{Difference} = 2800 - 2700 = 100$$

- 145.** The population of a town is 3,11,250. The ratio of women to men is 43 : 40. If there are 24% literate among women and 10% illiterate, among men, the total number of literate persons in the town is.

Sol. Population of town = 3,11,250
No. of women in town

$$= \frac{3,11,250}{(43+40)} \times 43 = 1,61,250$$

No. of literate women

$$= 1,61,250 \times \frac{24}{100} = 38700$$

No. of literate men in the town

$$= 1,50,000 \times \frac{(100-10)}{100}$$

$$= 1,50,000 \times \frac{90}{100} = 135000$$

Total literate persons in town
= (38700+135000) = 1,73,700

- 146.** In a factory the production of cycles rose to 25,600 from 19,600 in 2 years. The rate of growth per annum is

Sol. Present production = 19,600

After two years = 25,600

Time = 2 years

Rate = ?

According to the question,

Production after 2 years

$$\Rightarrow \text{Present production} \left(1 + \frac{R}{100}\right)^t$$

$$25,600 = 19,600 \left(1 + \frac{R}{100}\right)^2$$

$$\frac{256}{196} = \left(1 + \frac{R}{100}\right)^2$$

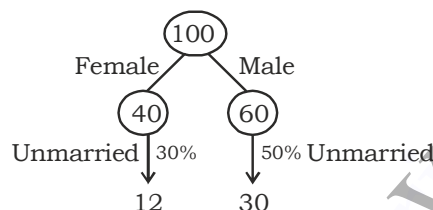
$$1 + \frac{R}{100} = \frac{16}{14}$$

$$\frac{R}{100} = \frac{1}{7}$$

$$R = \frac{100}{7} = 14\frac{2}{7}\%$$

- 147.** In a village, 40% of the population is female. 70% of the female and 50% of male are married. The Percentage of the unmarried population in the village is.

Sol. Let total population = 100



42 is unmarried out of 100

$$\text{Required \%} = \frac{42}{100} \times 100 = 42\%$$

- 148.** In the expression xy^2 , the values of both variables x and y are decreased by 20%. By this, the value of expression is decreased by.

Sol. $20\% = \frac{1}{5}$, $xy^2 = x \times y \times y$

	Initial Value	Final Value
$x \rightarrow$	5	4
$y \rightarrow$	5	4
$y \rightarrow$	5	4
	125	64

$$\text{Required \%} = \frac{61}{125} \times 100$$

$$= \frac{244}{5} = 48.8\%$$

RY - XV

- 149.** In an election between two candidates, Pankaj gets 65% of the total valid votes. If the total votes were 6000, what is the number of valid votes that the other candidate Nishant gets. if 25% of the total votes were declared invalid?

Sol. Let the total number of valid votes get by Nishant = x

According to the question,

$$x = 6000 \times \frac{75}{100} \times \frac{35}{100}$$

$$x = 1575$$

- 150.** In an election there are three candidates. The winning candidate got 55% votes and the candidate at the third place got 5% of the votes. If the winning candidate win by 9000 votes then find total number of votes while no vote was invalid.

Sol. The candidate at second place get = $100 - (55+5)\% = 40\%$ votes
Difference between wining and second candidate = $55 - 40 = 15\%$

According to the question,

$$15\% = 9000$$

$$1\% = 600$$

$$\text{Total votes} = 100 \times 600$$

$$= 60,000$$

- 151.** In a election between two candidates. The winning candidate got 80% of the total valid votes. If out of total 1,80,000 votes, 10% were declared invalid. Find the total number of valid votes got by the second candidate.

Sol. Total votes = 1,80,000

Invalid votes = 10%

$$\text{valid votes} = \frac{1,80,000 \times 90}{100}$$

Second candidates

$$= 1,80,000 \times \frac{90}{100} \times \frac{20}{100}$$

$$= 32,400$$

- 152.** In an election between two candidates. 10% of the voters did not cast their votes while 10% of the vote polled were declared invalid. If the winning candidate of got 54% of the valid votes and won by 1620 votes then find the total number of voters in the voter list.



Sol. Let total valid votes = 100%
Then, $54\% - 46\% = 1620$
 $8\% = 1620$

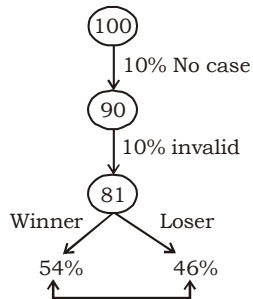
$$100\% = 1620 \times \frac{100}{8} = 20,250$$

According to the question,
Now the total no. of voters

$$= \frac{10}{9} \times \frac{10}{9} \times 20,250 = 25,000$$

Alternate:

Let the total valid votes = 100 units



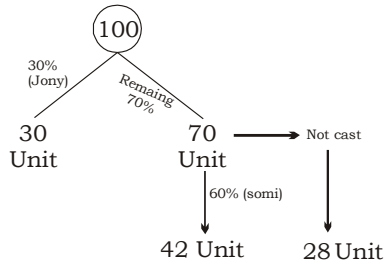
$$\begin{aligned} 8\% &\rightarrow 1620 \\ 1\% &\rightarrow 202.5 \\ 100\% &\rightarrow 20250 \\ 81 \text{ unit} &\rightarrow 20250 \text{ votes} \end{aligned}$$

$$1 \text{ unit} = \frac{20250}{81}$$

$$\begin{aligned} \text{Total votes} &= \frac{20250}{81} \times 100 \\ &= 25,000 \text{ votes} \end{aligned}$$

153. In an election 30% of the voters voted to Jony and 60% of the remaining voted to Somi and the remaining did not cast their vote. If the difference after number of voters voted to Jony and those who do not voted at all is 1200. If no vote was declared invalid. Find the number of voters who have the right to vote in this election.

Sol. Let total no. of voters = 100unit.



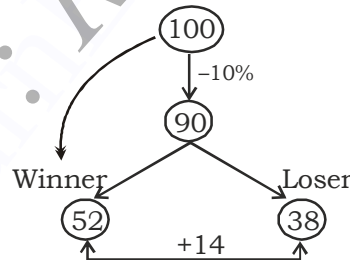
Difference of the no. of voters who vote for A and who did not cast their vote = $30x - 28x = 2x$

According to the question,
 $2x = 1200$, $x = 600$

Hence total no. of voters = $100 \times 600 = 60,000$

154. In an election two candidates participate 10% of the voters did not vote and out of total votes polled 2000 votes declared invalid. The winner gets 52% of the total votes on voting list and wins by 13200 votes. Find the no. of votes polled in favour of losing candidate?

Sol. Let the total no. of votes = 100units
According to the question,



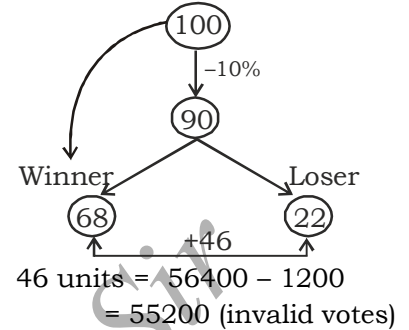
$$14 \text{ units} = 13200 - 2000 = 11200$$

$$1 \text{ unit} = \frac{11,200}{14} = 800$$

Votes polled for losing candidates = $800 \times 38 - 2000 = 30400 - 2000 = 28400$ votes

155. In an election 10% voters did not participated in an election and 1200 votes are found Invalid. The winner get 68% of total voting list and he won by 56400 votes. Find the votes polled in favour of losing candidate ?

Sol. Let the total votes = 100
According to the question,



$$1 \text{ unit} = \frac{55200}{46}$$

$$22 \text{ units} = \frac{55200}{46} \times 22$$

Votes for losing candidates

$$\frac{55200}{46} \times 22 - 1200 = 25200$$

156. 8% of voters in an election did not cast their votes. In this election there was only two candidates. The winner by obtaining 48% of the total votes defeated his contestant by 1100 votes. The total number of voters in the election was.

Sol. Let the total number of votes be 100

No. of uncast votes = 8

No. of votes polled = 92

No. of votes obtained by the loser = $92 - 48 = 44$

In the difference of win be 4 votes, total voters = 100

When the difference be 1100

$$\begin{aligned} \text{votes, total voters} &= \frac{100}{4} \times 1100 \\ &= 27500 \end{aligned}$$

So, total no. of votes = 27,500

157. In an Lok Sabha election a candidates got 55% of the total valid votes. 2% of the total votes were declared invalid. If the total no. of voters is 104000 then the number of valid votes polled in favour of the candidate is.



Sol. Number of valid votes

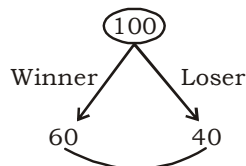
$$= 104000 \times \frac{98}{100} = 101920$$

∴ Valid votes received by the

$$\begin{aligned} \text{candidate} &= \frac{101920}{100} \times 55 \\ &= 56056 \end{aligned}$$

- 158.** In an office, there was only two candidates one of the candidates secured 40% of votes and as defeated by the other candidates by 298 votes. Find the total number of votes.

Sol. Let total votes = 100



$$20 \text{ unit} \rightarrow 298$$

$$1 \text{ unit} \rightarrow \frac{298}{20}$$

$$\begin{aligned} \text{Total votes} &= 100 \text{ unit} = \frac{298}{20} \\ &\times 100 = 1490 \end{aligned}$$

- 159.** In an assembly election between two candidates 75% of the voters cast their votes, out of which 2% votes were declared invalid. A candidates got 9261 votes which were 75% of the valid votes. The total number of votes enrolled in that election was.

Sol. Let the total number of voters enrolled be = x

$$\text{No. of votes polled} = 75\% \text{ of } x$$

$$= \frac{3x}{4}$$

No. of valid votes

$$= \frac{3x}{4} - \frac{2}{100} \times \frac{3x}{4}$$

$$= \frac{3x}{4} - \frac{3x}{200} = \frac{147x}{200}$$

$$\text{Now, } 75\% \text{ of } \frac{147x}{200} = 9261$$

$$\text{or } \frac{3}{4} \times \frac{147x}{200} = 9261$$

$$x = \frac{9261 \times 4 \times 200}{3 \times 147} = 16,800$$

- 160.** In a class 40% of the students are girls 40% of the girls and 60% of the boys voted for me. The percentage of votes I got was.

Sol. Let total students = 100

$$\begin{aligned} \text{Required \%} &= \frac{40 \times 40}{100} + \frac{60 \times 60}{100} \\ &= 16 + 36 = 52\% \end{aligned}$$

- 161.** In an election between two candidates one getting 60% of the votes polled, is elected by a majority of 14,000 votes. The number of votes polled for the winning candidate is.

Sol. Difference of % of votes
 $= 60\% - 40\% = 20\%$
 20% of total votes = 14000
 60% of total votes

$$= \frac{14000}{20} \times 60 = 42,000$$

- 162.** In an election a candidate secured 62% of the votes and is elected by a margin of 1440 votes. The total number of votes polled is

Sol. Let the total no. of votes polled be = x

According to the question,

$$\frac{x \times 62}{100} - \frac{x \times (100 - 62)}{100} = 1440$$

$$\frac{62x}{100} - \frac{38x}{100} = 1440$$

$$\frac{24x}{100} = 1440$$

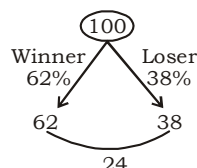
$$24x = 1440 \times 100$$

$$x = \frac{1440 \times 100}{24}$$

$$\text{No. of votes polled}(x) = 6000$$

Alternate:-

Let the total votes = 100



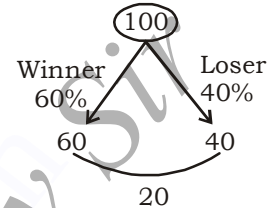
$$24 \text{ units} \rightarrow 1440$$

$$1 \text{ unit} \rightarrow 60$$

$$\text{Total votes} = 60 \times 100 = 6000$$

- 163.** Two candidates contested in an election in college one got 60% of the votes and won by 16000 votes. Find the number of votes polled ?

Sol. If the no. of votes polled be 100



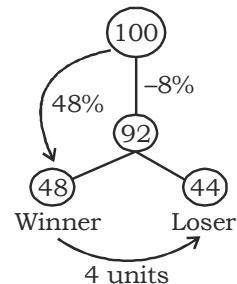
$$20 \text{ units} = 16000$$

$$1 \text{ unit} = 800$$

$$\begin{aligned} \text{Total votes} &= 800 \times 100 \\ &= 80,000 \end{aligned}$$

- 164.** 8% of the voters in an election did not cast their votes. In this election, there were only two candidates. The winner by obtaining 48% of the total votes defeated his contestant by 1600 votes. The total no. of voters in the election was.

Sol. Let the total no. of voters = 100 units



$$\text{Votes get by loser} = 92 - 48$$

$$= 44 \text{ units}$$

According to the question,

$$(48 - 44) \text{ units} = 1600$$

$$4 \text{ units} = 1600$$

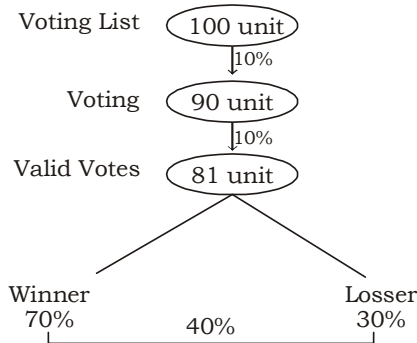
$$1 \text{ unit} = 400$$

$$\text{Total votes} = 100 \text{ units}$$

$$= 100 \times 400$$

$$= 40000$$

- 165.** In an election two candidate participated 10% voters did not vote, out of which 10% votes declare invalid and the winner get 70% of valid votes, and he win by 7290 votes, then find the voting list.

**Sol.**

$$81 \times \frac{40}{100} \text{ Unit} = 7290$$

$$1 \text{ unit} = \frac{7290 \times 100}{81 \times 40}$$

$$= 225 \text{ votes}$$

$$\text{Voting List} = 100 \text{ unit} \times 225$$

$$= 22,500$$

Alternative:-

Let the voter list = x

$$x \times \frac{9}{10} \times \frac{9}{10} \times \frac{40}{100} = 7290$$

$$x = 22,500$$

166. In an election two candidate participated, 20% voters did not cast their votes, out of which 600 votes declared invalid and the winner get 75% of valid votes and he wins by 1500 votes find the no. of voters in voting list.

Sol. Let the voter List = x

$$\text{voting} = x \times \frac{4}{5}$$

$$\text{Valid votes} = \left(\frac{4}{5} x - 600 \right)$$

$$\text{winner gets vote} = 75\%$$

$$\text{Losser gets votes} = 25\%$$

$$\text{Winning} = 75 - 25 = 50\%$$

Now,

$$\left(\frac{4}{5} x - 600 \right) \times \frac{50}{100} = 1500$$

$$x = 4500$$

167. In an election two candidate participated, 10% voter did not vote, 2500 votes declared invalid and the winner get 55% of valid votes and he win by 2000 votes. find the number of voters in voting list.

Sol: Let the voting list = x

$$\text{voting} = x \times \frac{90}{100} = \frac{9x}{10}$$

$$\text{valid votess} = \left(\frac{9x}{10} - 2500 \right)$$

$$\text{Winner gets} = 55$$

$$\text{Losser gets} = 45\%$$

$$\text{Wins} = 55 - 45 = 10\%$$

Now,

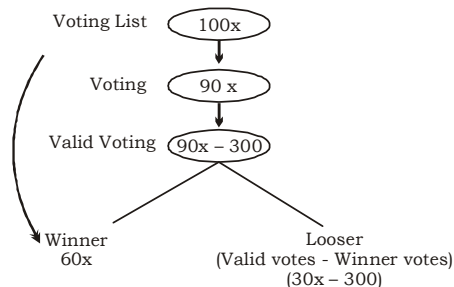
$$\left(\frac{9x}{10} - 2500 \right) \frac{10}{100} = 2000$$

$$\frac{9x}{100} - 250 = 2000$$

$$\frac{9x}{100} = 2250$$

$$x = 25,000$$

168. In an election two candidate participated 10% voters did not vote, 300 votes declared invalid and the winner get 60% votes of voting list and he win by 900 votes. Find the no. of valid votes.

Sol : Let the voting list

$$\text{Winner wins}$$

$$= 60x - (30x - 300) = 900$$

$$30x + 300 = 900$$

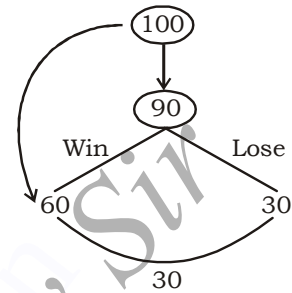
$$30x = 600$$

$$x = 20$$

$$\text{Valid votes} = 90x - 300 = 90 \times 20 - 300 = 1500$$

Alternate:

Let the total voting list = 100 units



$$90 - 300 = 600$$

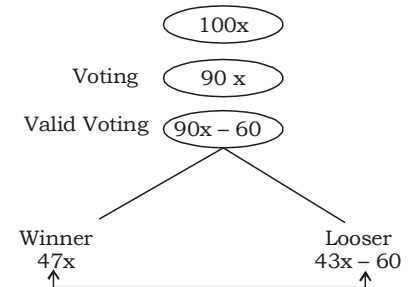
$$30 \text{ units} = 600$$

$$1 \text{ unit} = 20$$

$$\text{voting} = 90 \times 20 = 1800$$

$$\text{valid votes} = 1800 - 300 = 1500$$

169. In an election two candidate participated, 10% voters did not vote and 60 votes declare invalid and winner get 47% of voting list and he win by 308 votes. Find the no. of voting list.

Sol. Let the voting list

$$\text{Winner win} =$$

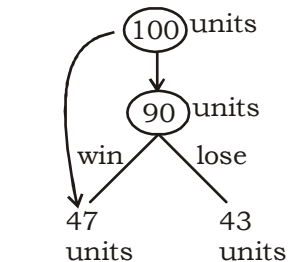
$$47x - (43x - 60) = 308$$

$$4x = 308 - 60$$

$$x = 62$$

$$\text{Voting List} = 100x$$

$$= 100 \times 62 = 6200$$

Alternate:

$$\text{Different between votes}$$

$$= \text{winning votes} - \text{invalid votes}$$

$$4 \text{ units} = 308 - 60 = 248$$

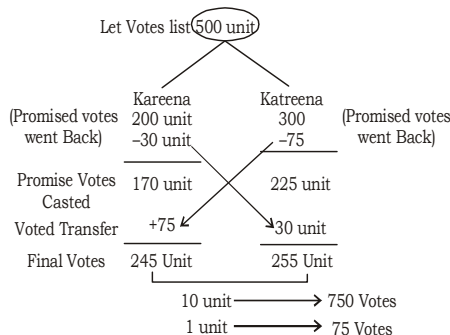
$$1 \text{ unit} = 62$$

$$\text{Total votes} = 62 \times 100 = 6200$$



- 170.** In an election Kareena and Katreena participated 2/5 of the voters promised to vote for Kareena and rest promise to vote for Katreena. On the voting day 15% of the voters went back on their promise to vote for Kareena and 25% of the voters went back on their promise to vote for Katreena. Find the total no. of voters if Katreena wins by 750 votes.

Sol: In such type of question let the value of Base of fraction with 100



So, Voter List = 500 unit × 75
= 37,500 Votes

- 171.** In an election, 3 candidate participated, the loosing candidate got 30% votes. What would be the minimum absolute margin votes by which the winning candidate led by the nearest rival if each candidate got an integral percent of votes.

Sol: If we need the minimum margin between 2 candidates then we need to give 30% votes to IIIrd position candidate. Remaining 70% votes is divided between Ist and IInd candidate, with minimum integral difference.

I	II	III
36%	34%	30%

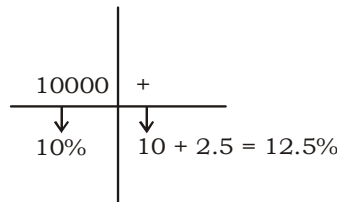
So, minimum % integral difference is 2% (36% - 34%)

but he ask minimum integral of votes (note % of votes) So, difference is 1 votes [when total votes are 50]

RY - XVI

- 172.** A Salesman gets 10% commission on the total sales and on extra bonus of 2.5% on the sale above Rs. 10,000. If he earns 2,875 rupees. Find the total sales.

Sol. Let the total sell be 'x' rupees.



$$\frac{10000 \times 2.5}{100} = 250$$

$$2875 + 250 = 3125$$

$$\text{Total sale} \times \frac{12.5}{100} = 3125$$

$$\text{Total sale} \times \frac{125}{100 \times 10} = 3125$$

$$\text{Total sale} = 3125 \times 8 = 25000$$

- 173.** Rakesh yadav gets a commission of 5% upto the sell of Rs. 10,000 and above this he gets 4% commission on the sale. If after deducting his commission he deposits Rs. 31100 to the company, Find his total sale.

Sol. Rakesh yadav got the 5% commission upto 10,000 and 4% above it.

Now let total sale be 'x' rupees. Then,

$$95\% \text{ of } (10,000) + 96\% \text{ of } (x - 10,000) = 31000$$

adding 1% of 10,000 on both sides i.e. 100

$$\Rightarrow 100 + 95\% \text{ of } (10,000) + 96\% \text{ of } (x - 10,000) = 31,100 + 100$$

$$\Rightarrow 95\% \text{ of } (10,000) + 96\% \text{ of } (x - 10,000) = 31,200$$

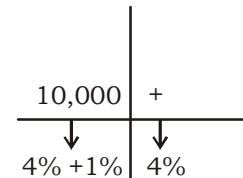
$$\Rightarrow 96\% \text{ of } x = 31,200$$

$$x = \frac{31200}{96} \times 100$$

$$= \text{Rs. } 32,500$$

Alternate:

Let the total sale = x



$$10000 \times \frac{1}{100} = 100$$

$$31100 + 100 = 31200$$

$$96\% \text{ of } x = 31200$$

$$x \times \frac{96}{100} = 31200$$

$$x = 32,500$$

- 174.** A salesman is hired on the condition a job saying that he will be given 6% commission on the sales done by him. But later on it was decided that he will be given a monthly salary of Rs. 1200 and every month, 3% commission will be awarded on sales above Rs. 5000. If in second case his earnings are Rs. 1350 less than earlier, then find his sales per month.

Sol. Let sales done by him is 100 x

Case I : Earnings are = 6x

Case II : Earnings are

$$\Rightarrow 1200 + (100x - 5000) \times \frac{3}{100}$$

$$= 1200 + (3x - 150)$$

According to question,

$$\Rightarrow 6x - (1200 + 3x - 150) = 1350$$

$$\Rightarrow 3x - 1200 + 150 = 1350$$

$$\Rightarrow 3x - 1050 = 1350$$

$$\Rightarrow 3x = 2400$$

$$\Rightarrow x = 800$$

$$\text{Total sales} = 100 \times 800$$

$$= \text{Rs. } 80,000$$



- 175.** A Salesman is allowed 12% commission on the total sales made by him and a bonus of 1% on the sales over Rs. 15,000. If the total earning of a salesman is Rs. 7650.

Find the total sales.

Sol. Let the total sales = x

$$x \times \frac{12}{100} + (x - 15000) \times \frac{1}{100} = 7650$$

$$\frac{12x}{100} + \frac{x}{100} - 150 = 7650$$

$$\frac{13x}{100} = 7800$$

$$x = 60000$$

Alternate:

Let the total sales

15000	+
↓	↓
12%	12% + 1%

$$1\% \text{ of } 15000 = \frac{15000 \times 1}{100} = 150$$

Let 13% commission on total sale

Then, total earning = 7650 + 150 = 7800

13% of total sale = 7800

$$\text{Total sale} \times \frac{13}{100} = 7800$$

Total sale = 60,000

- 176.** A salesman is allowed 9% commission on the total sales made by him and a bonus of 1% on the sales over Rs. 20,000. If the total earning of a salesman is Rs. 6800.

Sol. Let the total sales = x
Earning

$$x \times \frac{9}{100} + (x - 20,000) \times \frac{1}{100} = 6800$$

$$\frac{9x}{100} + \frac{x}{100} - 200 = 6800$$

$$\frac{10x}{100} = 7000$$

$$x = 70000$$

Alternate:

Let the total sales = x

20000	+
↓	↓
9%	9% + 1%

Let 10% commission on total sales

Then, earning

$$= 20000 \times \frac{1}{100} + 6800 = 7000$$

10% of $x = 7000$

$$x \times \frac{1}{10} = 7000$$

$$x = 70,000$$

- 177.** A Salesman is allowed $5\frac{1}{2}\%$ commission on the total sales made by him and a bonus of $1\frac{1}{2}\%$ on the sales over Rs. 10,000.

If his total earning is Rs. 1990
Find total sales.

Sol. Let the total sales = x

Earning $x \times 5\frac{1}{2}\% + (x - 10000)$

$$\times \frac{1}{2}\% = 1990$$

$$\frac{x \times 11}{2 \times 100} + (x - 10000) \times \frac{1}{2 \times 100} = 1990$$

$$\frac{11x}{200} + \frac{x}{200} - 50 = 1990$$

$$\frac{12x}{200} = 2040$$

$$x = 170 \times 200$$

$$x = 34,000$$

Alternate:

10,000	+
↓	↓
$5\frac{1}{2}\%$	$5\frac{1}{2}\% + 1\frac{1}{2}\%$

Let 6% commission on total sales

Then earning

$$10000 \times \frac{1}{2 \times 100} + 1990 = 2040$$

6% of total sales = 2040

$$\frac{6}{100} \times \text{Total sales} = 2040$$

Total sales = 34000

- 178.** A company give 12% commission to his salesman on total sales and 1% bonus on the sales over RS. 15000. If the salesman deposite Rs. 52,350 after deducting his earning from total sales. Find total sales.

Sol: Let the total sales = x

$$\text{Earning} \Rightarrow x \times \frac{12}{100} +$$

$$(x - 15000) \times \frac{1}{100}$$

$$\frac{12x}{100} + \frac{x}{100} - 150$$

$$\frac{13x}{100} - 150$$

ATQ Total sales - earning = 52,350

$$x - \left(\frac{13x}{100} - 150 \right) = 52,350$$

$$x - \frac{13}{100}x + 150 = 52350$$

$$\frac{87x}{100} = 52,200 \quad x = \text{Rs. } 60,000$$

Alternate:

15000	+
↓	↓
12%	12% + 1%

Let 13% commission of total sales



$$\text{Then, earning} = 15000 \times \frac{1}{100} = 150$$

$$\begin{aligned} \text{deposit Rs. after deducting earning} \\ = 52,350 - 150 = 52,200 \\ 87\% \text{ of } x = 52,200 \end{aligned}$$

$$x \times \frac{87}{100} = 52,200$$

$$\text{Total sales} = x = 60,000$$

RY - XVII

- 179.** 1 litre of water is added to 5 litres of alcohol water solution containing 40% alcohol strength. The strength of alcohol in the new solution will be...

Sol. Alcohol in original solution

$$= \frac{40}{100} \times 5 = 2 \text{ litres}$$

Water in original solution

$$= \frac{60}{100} \times 5 = 3 \text{ litres}$$

On adding 1 litre water, water becomes 4 litres.

Now, 6 litres of solution contains 2 litres of alcohol.

$\therefore$ 100 litres of solution

$$\text{contains} = \frac{2}{6} \times 100 = \frac{100}{3}$$

$$= 33\frac{1}{3}\% \text{ alcohol}$$

- 180.** If 4 litres of water is evaporated on boiling from 12 litres of salt solution containing 7% salt, the percentage of salt in remaining solution is...

Sol. In 12 litres salt solution,

$$\text{Salt} = \frac{7 \times 12}{100} = 0.84 \text{ units}$$

$$\text{Water} = 12 - 0.84$$

$$= 11.16 \text{ units}$$

After evaporation, percentage

$$\begin{aligned} \text{of salt} &= \frac{0.84}{8} \times 100 \\ &= 10.5\% \end{aligned}$$

- 181.** A vessel has 60 litres of solution of acid and water having 80% acid. How much water be added to make it a solution in which acid forms 60%.

Sol. In 60 litres solution, water

$$= \frac{60 \times 20}{100} = 12 \text{ litres}$$

On adding x litres of water

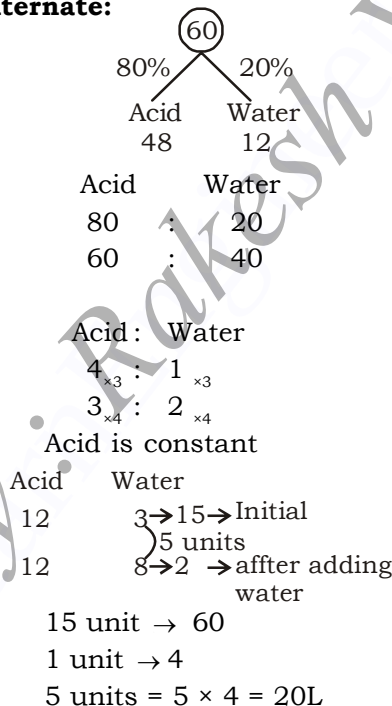
$$= \frac{12 + x}{60 + x} \times 100 = 40$$

$$\Rightarrow 60 + 5x = 120 + 2x$$

$$\Rightarrow 3x = 60$$

$$\Rightarrow x = 20 \text{ litres}$$

Alternate:



- 182.** A litre of pure alcohol is added to 6 litres of 30% alcohol solution. The percentage of water in the solution is...

Sol. In 30% alcohol solution,

$$\text{Alcohol} = \frac{30}{100} \times 6 = 1.8 \text{ litres}$$

$$\text{Water} = 4.2 \text{ litres}$$

On mixing 1 litre of pure alcohol, percentage of water

$$= \frac{4.2}{7} \times 100 = 60\%$$

- 183.** How much water must be added to 100 ml of 80 percent solution of boric acid to reduce it to a 50% solution.

Sol. Let x ml of water be added

$$\begin{aligned} \frac{20 + x}{100 + x} \times 100 &= 50 \\ \Rightarrow 40 + 2x &= 100 + x \\ \Rightarrow x &= 60 \text{ ml.} \end{aligned}$$

Alternate:

$$\begin{array}{cc} \text{Boric acid} & \text{Water} \\ 80 & : \quad 20 \\ 50 & : \quad 50 \end{array}$$

$$\text{Boric acid} : \text{Water} \\ 4 : 1$$

$$1_{\times 4} : 1_{\times 4}$$

Boric acid is constant

Then, equal the value of boric acid

$$\text{B.A} : \text{Water}$$

$$4 : 1 \rightarrow 5 \text{ units}$$

$$4 : 4 \rightarrow 8$$

$$5 \text{ units} \rightarrow 100 \text{ ml}$$

$$1 \text{ unit} \rightarrow 20 \text{ ml}$$

$$3 \text{ units} \rightarrow 3 \times 20 = 60 \text{ ml}$$

- 184.** In one litre of a mixture of alcohol and water, water is 30%. The amount of alcohol that must be added to mixture so that the part of water in the mixture becomes 15% is.

Sol. In 1 litre i.e. 1000 ml of mixture.

$$\text{Alcohol} = 700 \text{ ml,}$$

$$\text{Water} = 300 \text{ ml}$$

Let x ml of alcohol is mixed.

$$\therefore \frac{300}{1000 + x} \times 100 = 15$$

$$\Rightarrow 1000 + x = 2000$$

$$\Rightarrow x = 1000 \text{ ml}$$

Alternate:

$$\begin{array}{cc} \text{Alcohol} & \text{Water} \\ 70 & : \quad 30 \\ 85 & : \quad 15 \end{array}$$

$$\text{Alcohol} \quad \text{Water}$$

$$\begin{array}{cc} 7 & : \quad 3 \rightarrow 10 \\ 17 & : \quad 3 \rightarrow 20 \end{array} \quad 10$$

$$10 \text{ units} \rightarrow 1 \text{ litre} = 1000 \text{ ml}$$

$$1 \text{ unit} \rightarrow 100 \text{ ml}$$

$$10 \text{ unit} = 10 \times 100$$

$$= 1000 \text{ ml}$$



- 185.** 40 litre of a mixture of milk and water contains 10% of water, the water to be added, to make the water content 20% in the new mixture is.

Sol. Milk : Water

$$90 : 10$$

$$80 : 20$$

Milk : Water

$$9_{\times 4} : 1_{\times 4}$$

$$4_{\times 9} : 1_{\times 9}$$

Milk is constant

Milk : Water

$$\begin{array}{l} 36 : 4 \rightarrow 40 \\ 36 : 9 \rightarrow 45 \end{array} \Bigg\} 5$$

$$40 \text{ units} = 40$$

$$1 \text{ unit} = 1 \text{ litre}$$

$$5 \text{ unit} = 5 \times 1 = 5 \text{ litres.}$$

- 186.** How much pure alcohol has to be added to 400 ml of a solution containing 15% of alcohol to change the concentration of alcohol in the mixture to 32%?

Sol. Alcohol = $\left(\frac{15}{100} \times 400\right) \text{ ml} = 60 \text{ ml}$

$$\text{Water} = 340 \text{ ml}$$

Let x ml of alcohol be added,

$$\text{Then, } \frac{60+x}{400+x} \times 100 = 32$$

$$\Rightarrow \frac{60+x}{400+x} = \frac{8}{25}$$

$$\Rightarrow 1500 + 25x = 3200 + 8x$$

$$\Rightarrow 17x = 1700$$

$$\Rightarrow x = 100 \text{ ml}$$

Alternate:

Alcohol : Water

$$15 : 85$$

$$32 : 68$$

Alcohol : Water

$$\begin{array}{l} 3 : 17 \rightarrow 20 \\ 8 : 17 \rightarrow 25 \end{array} \Bigg\} 5$$

Water is constant

$$20 \text{ units} \rightarrow 400$$

$$1 \text{ unit} \rightarrow 20 \text{ litre}$$

$$5 \text{ units} \rightarrow 5 \times 20 = 100 \text{ litre}$$

- 187.** In 50 gm alloy of gold and silver, the gold is 80% by weight. How much gold should be mixed to this alloy so that the weight of gold would become 95%?

Sol. Initial quantity of gold

$$= \frac{50 \times 80}{100} = 40 \text{ gm}$$

Let x gm be mixed,

$$40 + x = (50 + x) \times \frac{95}{100}$$

$$\Rightarrow 40 + x = (50 + x) \times \frac{19}{20}$$

$$\Rightarrow 800 + 20x = 950 + 19x$$

$$\Rightarrow x = 150 \text{ gm}$$

Alternate:

Gold : Silver

$$80 : 20$$

$$95 : 5$$

Gold : Silver

$$4 : 1 \rightarrow 5 \quad 15$$

$$19 : 1 \rightarrow 20$$

Silver is constant

$$5 \text{ units} \rightarrow 50$$

$$1 \text{ unit} \rightarrow 10 \text{ gm}$$

$$15 \text{ units} = 15 \times 10 = 150 \text{ gm}$$

- 188.** 300 gm of sugar solution has 40% of sugar in it. How much sugar should be added to make it 50% in the solution?

Sol. In 300 gm of solution,

$$\text{Sugar} = 300 \times \frac{40}{100} = 120 \text{ gm}$$

Let x gm of sugar be mixed.

According to question,

$$\frac{120+x}{300+x} = \frac{1}{2}$$

$$\Rightarrow 240 + 2x = 300 + x$$

$$\Rightarrow x = 60 \text{ gm}$$

Alternate:

Sugar : Other

$$40 : 60$$

$$50 : 50$$

Sugar : Other

$$2_{\times 1} : 3_{\times 1}$$

$$1_{\times 3} : 1_{\times 3}$$

Other solution is constant

Sugar : Other

$$\begin{array}{l} 2 : 3 \rightarrow 5 \\ 3 : 3 \rightarrow 6 \end{array} \Bigg\} 1$$

$$5 \text{ units} \rightarrow 300$$

$$1 \text{ unit} = 60 \text{ gm}$$

- 189.** In what ratio must 25% of alcohol be mixed with 50% of alcohol to get a mixture of 40% strength alcohol?

Sol.

$$\begin{array}{ccc} \text{Alcohol I} & & \text{Alcohol II} \\ \frac{1}{4} & & \frac{1}{2} \\ & \searrow \quad \swarrow & \\ & \frac{2}{5} & \text{Mean Value} \\ & \swarrow \quad \searrow & \\ \frac{1}{2} - \frac{2}{5} = \frac{1}{10} & & \frac{2}{5} - \frac{1}{4} = \frac{3}{20} \end{array}$$

$\therefore$ The required ratio

$$= \frac{1}{10} : \frac{3}{20} = 2 : 3$$

Alternate:

$$\begin{array}{ccc} \text{Alcohol I} & : & \text{Alcohol II} \\ 25 & & 50 \\ & \searrow \quad \swarrow & \\ & 40 & \\ & \swarrow \quad \searrow & \\ 10 & : & 15 \end{array}$$

Required ratio = 2 : 3

- 190.** In a class the average score of girls in an exam is 73 and that of boys is 71. The average score for the whole class is 71.8. Find the % of girls.

Sol. By alligation rule,

$$\begin{array}{ccc} \text{Girls} & & \text{Boys} \\ 73 & & 71 \\ & \searrow \quad \swarrow & \\ & 71.8 & \\ & \swarrow \quad \searrow & \\ 0.8 & & 1.2 \\ \text{Ratio} \rightarrow 2 & : & 3 \end{array}$$

Required % of girls

$$= \frac{2}{3+2} \times 100 = 40\%$$



- 191.** The ratio in which two sugar solutions of the concentrates 15% and 40% are to be mixed to get a solution of concentration 30% is.

Sol. By using Allegation Rule,



Ratio of $\rightarrow 10 : 15$
Quantity $2 : 3$

- 192.** The population of a village was 9800. In a year with the increase in population of males by 8% and that of Females by 5% the population of the village became 10458. What was the number of males in the village before increase.

Sol. Increase in Population
= $10458 - 9800 = 658$

$$\begin{aligned}\% \text{ increment} &= \frac{658}{9800} \times 100 \\ &= \frac{47}{7} \%\end{aligned}$$

Using allegation method,

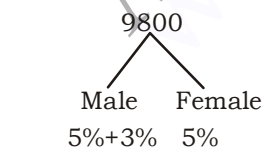
Note: to make calculation easier multiply by 7 to all data



Ratio $\rightarrow 12 : 9$
 $4 : 3$
Required population of males

$$= \frac{9800}{4+3} \times 4 = 5600$$

Alternate:-



$$= \frac{9800 \times 5}{100} = 490$$

Increase in population
= $10450 - 9800 = 658$

Now,

$$658 - 490 = 168$$

$$3\% \text{ of male} = 168$$

$$\text{No. of male} = \frac{168}{3} \times 100 = 5600$$

RY - XVIII

- 193.** In an examination 65% students failed in maths and 75% students failed in english while 52% students failed in both the subjects. If 48 students passed in both the subjects then find the total no. of students appeared in the examination

Sol. Fail in maths Fail in English

total % of failed students
= $13 + 52 + 23 = 88$

Hence % of passed students
= $(100 - 88)\% = 12\%$

According to the question
= 12% of the total students = 48
total no. of students

$$= 48 \times \frac{100}{12} = 400$$

- 194.** In an examination 80% students passed in physics, 70% in chemistry while 15% failed in both the subjects. If 325 students passed in both the subjects. Find the total numbers of students who appeared in the examination.

Sol. Physics Chemistry

(Failed venn diagram of students)

total failed students

$$= 5 + 15 + 15 = 35\%$$

total passed students

$$= (100 - 35)$$

$$= 65\%$$

According to the question

$$= 65\% = 325$$

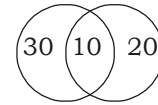
$$1\% = \frac{325}{65}$$

Total students (100%)

$$= \frac{325}{65} \times 100 = 500$$

- 195.** In an examination 40% of the students failed in maths, 30% failed in English and 10% failed in both. Find the percentage of students who passed in both the subjects.

Sol.



The percentage of students who fail in one or two or both subjects = $40 + 30 - 10 = 60\%$
So, percentage of passed students = $100 - 60 = 40\%$

- 196.** 600 students took the test on physics and chemistry 35% students failed in physics and 45% students failed in chemistry and 40% of those who passed in chemistry also passed in physics. Then how many students failed in both.

Sol. Passed students in Physics Passed students in Chemistry

Students passed in Physics
= $(100 - 35) = 65\%$

Student passed in Chemistry
= $(100 - 45) = 55\%$

Student passed in either one or both subjects

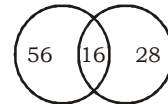
$$= (65 + 55 - 40) = 80\%$$

Hence students failed in both subjects = 20%

$$= \frac{20}{100} \times 600 = 120$$

- 197.** In a group every person takes either tea or coffee or both. If 72% persons take tea and 44% persons take coffee. If there are 192 persons take tea and coffee, then find total no. of persons in the group

Sol.



Persons taking either tea or coffee = $72 + 44 = 116\%$

Total persons = 100%

Hence 16% of persons take both tea and coffee.

$$16\% \rightarrow 192 \text{ (given)}$$

$$100\% = \frac{192}{16} \times 100 = 1200$$

$\therefore$ The total number of persons in the group are = 1200



Exercise

1. Student A scores 20 marks in an examination out of 30 while another student B scores 40 marks out of 70. Who has performed better ?
(a) A (b) B
(c) A = B
(d) Can't be determined
2. Company A increases its sales by 1 crore rupees while company B increases its sales by 10 crore rupees. Which company has more percentage growth?
(a) A (b) B
(c) Both have same growth rate
(d) Can't be determined
3. The population of a city grew from 20 lakh to 22 lakh. Find the percentage change based on the final value of population.
(a) $9\frac{1}{11}\%$ (b) 8%
(c) 9% (d) 10%
4. A sells his goods 30% cheaper than B and 30% dearer than C. By what percentage is the cost of C's goods cheaper than B's goods.
(a) 46.15% (b) 47.15%
(c) 67% (d) 67.15%
5. The length and the breadth of a rectangle are changed by +20% and by -10% respectively. What is the percentage change in the area of the rectangle.
(a) 8% increase
(b) 8% decrease
(c) 10% increase
(d) None of these
6. Due to a 25% price high in the price of rice, a person is able to purchase 20 kg less of rice for Rs. 400. Find the initial price.
(a) 4 Rs/kg (b) 5 Rs/kg
(c) 8 Rs/kg (d) None of these
7. A's salary is 20% lower than B's salary, which is 15% lower than C's salary. By how much percent is C's salary more than A's salary?
(a) $47\frac{1}{7}\%$ (b) $48\frac{1}{7}\%$
(c) $47\frac{2}{7}\%$ (d) None of these
8. The cost of manufacture of an article is made up of four components A, B, C and D which have a ratio of 3 : 4 : 5 : 6 respectively. If there are respective changes in the cost of +10%, -20%, -30%, and +40%, then what would be the percentage change in the cost.
(a) $2\frac{2}{9}\%$ (b) $3\frac{2}{9}\%$
(c) 4% (d) $1\frac{2}{9}\%$
9. Rakesh Yadav receives an inheritance of a certain amount from his grandfather. Of this he loses 32.5% in his effort to produce a film. From the balance, a taxi driver stole the sum of Rs. 1,00,000 that he used to keep in his pocket. Of the rest, he donated 20% to a charity. Further he purchases a flat in Ganga Apartment for Rs. 7.5 lakh. He then realises that he is left with only Rs. 2.5 lakh cash of his inheritance. What was the value of his inheritance ?
(a) 25 lakh (b) 22.5 lakh
(c) 20 lakh (d) 18 lakh
10. What is 20% of 50% of 75% of 70?
(a) 5.25 (b) 6.75
(c) 7.25 (d) 5.5
11. If we express $41\frac{3}{17}\%$ as a fraction, then it is equal to
(a) $\frac{17}{7}$ (b) $\frac{7}{17}$
(c) $\frac{12}{17}$ (d) $\frac{3}{17}$
12. Mr. Rakesh Yadav is worried about the balance of his monthly budget. The price of petrol has increased by 40%. By what percent should he reduce the consumption of petrol so that he is able to balance his budget?
(a) 33.33 (b) 28.56
(c) 25 (d) 14.28
13. In Question 12, if Rakesh Yadav wanted to limit the increase in his expenditure to 5% on his basic expenditure on petrol, then what should be the corresponding decrease in consumption.
(a) 33.33 (b) 28.56
(c) 25 (d) 20
14. Ram sells his goods 25% cheaper than Shyam and 25% dearer than Balram. How much percentage is Balram's goods cheaper than Shyam's ?
(a) 33.33% (b) 50%
(c) 66.66% (d) 40%
15. In an election between 2 candidates, Rakesh Yadav gets 65% of the total valid votes. If the total votes were 6000, what is the number of valid votes that the other candidate Bhuvnesh gets, if 25% of the total votes were declared invalid ?
(a) 1625 (b) 1575
(c) 1675 (d) 1525
16. In a medical certificate, by mistake a candidate gave his height as 25% more than normal. In the interview panel, he clarified that his height was 5 feet 5 inches. Find the percentage correction made by the candidate from his stated height to his actual height.
(a) 20% (b) 28.56%
(c) 25% (d) 16.66%
17. Arjit Sharma generally wears his father's coat. Unfortunately, his cousin Shaurya poked him one day that he was wearing a coat of length more than his height by 15%. If the



- length of Arjit's father's coat is 120 cm then what should be the actual length of the his coat.
- (a) 105 (b) 108
(c) 104.34 (d) 102.72
18. A number is mistakenly divided by 5 instead of being multiplied by 5. Find the percentage change in the result due to this mistake.
- (a) 96% (b) 95%
(c) 2400% (d) 200%
19. The price of an item is increased by 20 % and then decreased by 20 %. The final price as compared to original price is:
- (a) 20 % less (b) 20 % more
(c) 4 % more (d) 4 % less
20. 50% of a% of b is equal to 75% of b% of c. Which of the following is c?
- (a) 1.5a (b) 0.667a
(c) 0.5a (d) 1.25a
21. The length, breadth and height of a room in the shape of a cuboid are increased by 10%, 20% and 50% respectively. Find the percentage change in the volume of the cuboid.
- (a) 77% (b) 75%
(c) 88% (d) 98%
22. The price of sugar is reduced by 25% but inspite of the decrease, Aayush ends up increasing his expenditure on sugar by 20%. What is the percentage change in his monthly consumption of sugar ?
- (a) +60% (b) -10%
(c) +33.33% (d) 50%
23. When 60% of number A is added to another number B, B becomes 175% of its previous value. Then which of the following is true regarding the values of A and B ?
- (a) $A > B$ (b) $B > A$
(c) $B \geq A$
(d) either (a) or (b) can true depending upon the values of A and B
24. In an election, the candidate who got 56% of the votes cast won by 144 votes. Find the total number of voters in the voting list if 80% people cast their vote and there were no invalid votes.
- (a) 360 (b) 720
(c) 1800 (d) 1500
25. The population of a village is 1,00,000. The rate of increase is 10% per annum. Find the population at the start of the third year.
- (a) 1,33,100 (b) 1,21,000
(c) 1,18,800 (d) 1,20,000
26. The population of the Mukherjee Nagar is 10,000 at this moment. It increases by 10% in the first year. However, in the second year, due to immigration, the population drops by 5%. Find the population at the end of the third year if in the third year the population increases by 20%.
- (a) 12,340 (b) 12,540
(c) 1,27,540 (d) 12,340
27. Rakesh Yadav invests Rs. 10,000 in some shares in the ratio 2 : 3 : 5 which pay dividends of 10%, 25% and 20% (on his investment) for that year respectively. Find his dividend income.
- (a) 1900 (b) 2000
(c) 2050 (d) 1950
28. In an examination, Rakesh Yadav obtained 20% more than Bhuvnesh but 10% less than Pawan. If the marks obtained by Bhuvnesh is 1080. find the percentage marks obtained by Pawan if the full marks is 2000.
- (a) 86.66% (b) 72%
(c) 78.33% (d) 77.77%
29. In a class, 25% of the students were absent for an exam. 30% failed by 20 marks and 10% just passed because of grace marks of 5. Find the average score of the class if the remaining students scored an average of 60 marks and the pass marks are 33 (conunting the final scores of the candidates).
- (a) 37.266 (b) 37.6
(c) 37.8 (d) 36.93
30. Rakesh Yadav spends 20% of his monthly income on his household expenditure, 15% of the rest on books, 30% of the rest on clothes and saves the rest. On counting, he comes to know that he has finally saved Rs. 9520. Find his monthly income.
- (a) 10000 (b) 15000
(c) 20000 (d) 12000
31. Rakesh Yadav and Bhuvnesh have salaries that jointly amount to Rs. 10,000 per month. They spend the same amount monthly and then it is found that the ratio of their savings is 6 : 1. Which of the following can be Rakesh Yadav's salary ?
- (a) Rs 6000 (b) Rs 5000
(c) Rs 4000 (d) Rs 3000
32. The population of a village is 5500. If the number of males increase by 11% and the number of females increases by 20% then the population becomes 6330. Find the population of females in the town.
- (a) 2500 (b) 3000
(c) 2000 (d) 3500
33. Bhuvnesh's salary is 75% more than Saurabh's. Bhuvnesh got a raise of 40% on his salary while Saurabh got a raise of 25% on his salary. By what percent is Bhuvnesh's salary more than Saurabh's ?
- (a) 96% (b) 51.1%
(c) 90% (d) 52.1%



34. Last year, the Indian cricket team played 40 one day cricket matches out of which they managed to win only 40%. This year, so far it has played some matches, which has made it mandatory for it to win 80% of the remaining matches to maintain its existing winning percentage. Find the number of matches played by India so far this year.
(a) 30 (b) 25
(c) 28
(d) Insufficient Information
35. In the recent, climate conference in New York, out of 700 men, 500 women, 800 children present inside the building premises, 20% of the men, 40% of the women and 10% of the children were Indians. Find the percentage of people who were not Indian.
(a) 73% (b) 77%
(c) 79% (d) 83%
36. A cow and a calf cost Rs. 2000 and Rs. 1400 respectively. If the price of the cow and that of the calf is increased by 20% and 30% respectively then the price of 1 dozen cows and 2 dozen calves is:
(a) 72,480 (b) 71,360
(c) 74,340 (d) None of these
37. During winters, an athlete can run 'x' meters on one bottle of Glucose. But in the summer, he can only run 0.5x meters on one bottle of Glucose. How many bottles of Glucose are required to run 400 meters during summer ?
(a) $800/x$ (b) $890/x$
(c) 96 (d) $454/x$
38. Out of the total production of iron from hematite, an ore of iron, 20% of the ore gets wasted, and out of the remaining ore, only 25% is pure iron. If the pure iron obtained in a year from a mine of hematite was 80,000 kg, then the quantity of hematite mined from that mine in the year is
(a) 5,00,000 kg
(b) 4,00,000 kg
(c) 4,50,000 kg
(d) None of these
39. A man buys a truck for Rs. 2,50,000. The annual repair cost comes to 2.0% of the price of purchase. Besides, he has to pay an annual tax of Rs. 2000. At what monthly rent must he rent out the truck to get a return of 15% on his net investment of the first year ?
(a) Rs 3350 (b) Rs 2500
(c) Rs 4000 (d) Rs 3212.50
40. Recently, while shopping in Mukherjee Nagar, Delhi, I came across two new shirts selling at a discount. I decided to buy one of them for my little boy Sherry. The shopkeeper offered me the first shirt for Rs. 42 and said that it usually sold for $\frac{8}{7}$ of that price. He then offered me the other shirt for Rs. 36 and said that it usually sold for $\frac{7}{6}$ th of that price. Of the two shirts which one do you think is a better bargain and what is the percentage discount on it ?
(a) First shirt, 12.5%
(b) second shirt, 14.28%
(c) Both are same
(d) None of these
41. $\frac{4}{5}$ th of the voters in Delhi promised to vote for Rakesh Yadav and the rest promised to vote for Bhuvnesh. Of these voters, 10% of the voters who had promised to vote for Rakesh Yadav did not vote on the election day, while 20% of the voters who had promised to vote for Bhuvnesh did not vote on the election day. What is the total number of votes polled if Rakesh Yadav got 216 votes ?
(a) 200 (b) 300
(c) 264 (d) 100
42. In an examination, 80% students passed in Physics, 70% in Chemistry while 15% failed in both the subjects. If 325 students passed in both the subjects. Find the total number of students who appeared in the examination.
(a) 500 (b) 400
(c) 300 (d) 600
43. Rakesh Yadav spends 30% of his salary on house rent, 30% of the rest he spends on his children's education and 24% of the total salary he spends on clothes. After his expenditure, he is left with Rs. 2500. What is Rakesh Yadav's salary ?
(a) Rs 11,494.25
(b) Rs. 20,000
(c) Rs 10,000
(d) Rs.15,000
44. The entrance ticket at the Batra cinema in Delhi is worth Rs. 250. When the price of the ticket was lowered, the sale of tickets increased by 50% while the collection recorded a decrease of 17.5%. Find the deduction in the ticket price
(a) Rs 150 (b) Rs. 112.5
(c) Rs 105 (d) Rs. 120
45. Rakesh Yadav's monthly salary is A rupees. Of this, he spends X rupees. The next month he has an increase of C% in this salary and D% in his expenditure. The new amount saved is:



- (a) $A(1+C/100) - X(1+D/100)$
 (b) $(A/100)(C - (D)X(1+D/100))$
 (c) $X(C - (D)/100)$
 (d) $X(C + D)/100$
46. In the year 2000, the luxury car industry had two car manufactures – Maruti and Honda with market shares of 25% and 75% respectively. In 2001, the overall market for the product increased by 50% and a new player BMW also entered the market and captured 15% of the market share. If we know that the market share of Maruti increased to 50% in the second year, the share of Honda in that year was:
 (a) 50% (b) 45%
 (c) 40% (d) 60%
47. Ambani, a very clever businessman, started off a business with very little capital. In the first year, he earned a profit of 50% and donated 50% of the total capital (initial capital + profit) to a charitable organisation. The same course was followed in the 2nd and 3rd years also. If at the end of three years, he is left with Rs. 16,875, then find the amount donated by him at the end of the 2nd year.
 (a) Rs 45,000 (b) Rs 12,500
 (c) Rs 22,500 (d) Rs 20,000
48. In an examination, 48% students failed in Hindi and 32% students in History, 20% students failed in both the subjects. If the number of students who passed the examination was 880, how many students appeared in the examination if the examination consisted only of these two subjects ?
 (a) 2000 (b) 2200
 (c) 2500 (d) 1800
49. At IIM Bangalore, 60% of the students are boys and the rest are girls. Further 15% of the boys and 7.5% of the girls are getting a fee waiver. If the number of those getting a fee waiver is 90, find the total number of students getting 50% concession if it is given that 50% of those not getting a fee waiver are eligible to get half fee concession?
 (a) 360 (b) 280
 (c) 320 (d) 330
50. A machine depreciates in value each year at the rate of 10% of its previous value. However, every second year there is some maintenance work so that in that particular year, depreciation is only 5% of its previous value. If at the end of the fourth year, the value of the machine stands at Rs. 1,46,205, then find the value of machine at the start of the first year.
 (a) Rs 1,90,000
 (b) Rs 2,00,000
 (c) Rs 1,95,000
 (d) Rs 2,10,000
51. Rakesh Yadav's project report consists of 25 pages each of 60 lines with 75 characters on each line. In case the number of lines is reduced to 55 but the number of characters is increased to 90 per lines. What is the percentage change in the number of pages. (Assume the number of pages to be a whole number)
 (a) + 10% (b) +5%
 (c) - 8% (d) - 10%
52. The price of soap is collectively decided by five factors : research, raw materials, labour, advertisements transportation. Assume that the functional relationship is :
 $\text{Price of soap} = (k \times \text{Research costs} \times \text{Raw material costs} \times \text{Labour costs} \times \text{Advertising cost} \times \text{Transportation cost})$
- If there are respective changes of 10% , 20% , -20%, 25% and 50% in the five factors, then find the change in the price of soap.
 (a) 97% (b) 95%
 (c) 98% (d) 96%
53. After receiving two successive raises, Rakesh Yadav's salary became equal to $15/8$ times of his initial salary. By how much percent was the salary raised the first time if the second raise was twice as high (in percent) as the first ?
 (a) 15% (b) 20%
 (c) 25% (d) 30%
54. The ratio of Bhuvnesh' salary for October to his salary for November was 1.5 : 1.333 and the ratio of the salary for November to that for December was 2 : 2.6666. The worker got 40 rupees more for December than for October and received a bonus constituting 40% per cent of the salary for three months. Find the bonus. (Assume that the number of workdays is the same in every month.)
 (a) 368.888 rupees
 (b) 152.5555 rupees
 (c) 222.22 rupees
 (d) 265.6 rupees
55. After three successive equal percentage rise in the salary the sum of 100 rupees turned into 140 rupees and 49 paise. Find the percentage rise in the salary.
 (a) 12% (b) 22%
 (c) 66% (d) 82%
56. Rakesh Yadav goes to a shop to buy a sofa set costing Rs. 13,080. The rate of sales tax is 9%. He tells the shopkeeper to reduce the price of the sofa set of such an extent that he has to pay Rs. 13080 inclusive of sales tax. Find the percentage reduction needed in the price of the sofa set to just satisfy his requirement.
 (a) 8.33% (b) 8.26%
 (c) 9% (d) 8.5%



57. The price of a certain article was raised by 10% in India. The consumption of the same article was increased from 200 tons to 225 tons. By how much percent will the expenditure on the article rise in the Indian economy ?
 (a) 24.25% (b) 22.5%
 (c) 23.75% (d) 26.75%
58. In the university examination last year, Rakesh Yadav scored 65% in English and 82% in History. What is the minimum percent he should score in Sociology, which is out of 50 marks (if English and History were for 100 marks each), if he aims at getting 78% overall ?
 (a) 94% (b) 92%
 (c) 98% (d) 96%
59. King Dashratha, at his eleventh hour, called his three queens and distributed his gold in the following way: He gave 50% of his wealth to his first wife, 50% of the rest to his second wife and again 50% of the rest to his third wife. If their combined share is worth 1,30,900 kilograms of gold, find the quantity of gold King Dashratha was having initially?
 (a) 1,50,000 kg
 (b) 1,49,600 kg
 (c) 1,51,600 kg
 (d) 1,52,600 kg
60. The population of New Foundland increases with a uniform rate of 8% per annum, but due to immigration, there is a further increase of population by 1% (however, this 1% increase in population is to be calculated on the population after the 8% increase and not on the previous years population). Find what will be the percentage increase in population after 2 years.
 (a) 18.984 (b) 18.081
 (c) 18.24 (d) 17.91
61. 10% of Mexico's population migrated to South Asia, 10% of the remaining migrated to America and 10% of the rest migrated to Australia. If the female population, which was left in Mexico, remained only 3,64,500, find the population of Mexico city before the migration and its effects if it is given that before the migration the female population was half the male population and this ratio did not change after the migration ?
 (a) 10,00,000 (b) 12,00,000
 (c) 15,00,000 (d) 16,00,000
62. According to a recent survey report issued by the Commerce Ministry, Government of India, 30% of the total FDI goes to Gujarat and 20% of this goes to rural areas. If the FDI in Gujarat, which goes to urban areas is \$72 m. If 20% of the total FDI goes to Andhra Pradesh and 50% of this goes to rural areas then find the size of FDI in rural Andhra Pradesh?
 (a) \$30 m (b) \$9 m
 (c) \$60 m (d) \$40 m
63. The cost of food accounted for 25% of the income of particular family. If the income gets raised by 20% then what should be the percentage point decrease in the food expenditure as a percentage of the total income to keep the food expenditure unchanged between the two years ?
 (a) 3.5 (b) 8.33
 (c) 4.16 (d) 5
64. If the length, breadth and height of a cube are decreased, decreased and increased by 5%, 5% and 20% respectively, then what will be the impact on the volume of the cube (in percentage terms)?
 (a) 7.25% (b) 5%
 (c) 8.3% (d) 20.75%
65. A's salary is first increased by 25% and then decreased by 20%. The result is the same as B's salary increased by 20% and then reduced by 25%. Find the ratio of B's salary to that of A's
 (a) 4 : 3 (b) 11 : 10
 (c) 10 : 9 (d) 12 : 11
66. A person saves 6% of his income. Two years later, his income shoots up by 15% but his savings remain the same. Find the hike in his expenditure.
 (a) 15.95% (b) 15%
 (c) 14.8% (d) 15.5%
67. A is 50% more than B, C is $\frac{2}{3}$ of A and D is 60% more than C. Now, each of A, B, C and D is increased by 10%. Find what per cent of B is D (after the increase) ?
 (a) 150% (b) 160%
 (c) 175% (d) 176%
68. A and B have, Rs. 1200. A spends 12% of his money while B spends 20% of his money. They are then left with a sum that constitutes 85% of the whole sum. Find what amount is left with A.
 (a) Rs 750 (b) Rs 800
 (c) Rs 700 (d) Rs 660
69. Bhuvnesh has Rs. B and his friend Saurabh has Rs. S. Bhuvnesh spends 12% of her money and Saurabh also spends the same amount as Bhuvnesh did. What percentage of his money did Saurabh spend ?
 (a) $\frac{18B}{S}$ (b) $\frac{18S}{B}$
 (c) $\frac{12B}{S}$ (d) $\frac{12S}{B}$
70. In order to maximise his gain, a theatre owner decides to reduce the price of tickets by 20% and as a result of this, the sales of tickets increase by 40%. If, as a result of these changes, he is able to increase his weekly collection by Rs. 1,68,000, find by what value did the gross collection increase per day.
 (a) 14,000 (b) 18,000
 (c) 24,000 (d) 20,000



71. In a town consisting of three localities A, B and C, the population of the three localities A, B and C are in the ratio 9 : 8 : 3. In locality A, 80% of the people are literate, in locality B, 30% of the people are illiterate. If 90% people in locality C are literate, Find the percentage literacy in that town.
 (a) 61.5% (b) 78%
 (c) 75% (d) None of these
72. A fraction is such that if the double of the numerator and the triple of the denominator is changed by +10% and -30% respectively then we get 11% of 16/21. Find the fraction.
 (a) $\frac{4}{25}$ (b) $\frac{2}{25}$
 (c) $\frac{3}{25}$ (d) None of these
73. To pass an examination, 40% marks are essential. A obtains 10% marks less than the pass marks and B obtains 11.11% marks less than A. What percent less than the sum of A's and B's marks should C obtain to pass the exam ?
 (a) 40% (b) 41(3/17)%
 (c) 28% (d) Any of these
74. The hourly wages of a female labour are increased by 12.5% whereas the weekly working hours are reduced by 8%. Find the percentage change in the weekly wages if she was getting Rs. 1200 per week for 50 hours previously.
 (a) +3.5% (b) 4%
 (c) 4.5% (d) None of these
75. Two numbers X and Y are 20% and 28% less than a third number Z. Find by What percentage is the number Y less than the number X.
 (a) 8% (b) 12%
 (c) 10% (d) 9%

76. Price of a commodity is first increased by $x\%$ and then decreased by $x\%$. If the new price is $K/100$, find the original price.
 (a) $(x-100) 100/K$
 (b) $(x^2-100^2)100/K$
 (c) $(100-x) 100/K$
 (d) $100K/(100^2-x^2)$
77. The salary of Rakesh Yadav is increased by Rs. 4800 and the rate of tax is decreased by 2% from 12% to 10%. If in the both cases 20% of the income is tax free then find the increased salary?
 (a) Rs 32,800 (b) Rs 36,800
 (c) Rs 28,000 (d) none of these
78. Rakesh Yadav goes to a shop to buy an FM radio costing Rs. 2568 including sales tax at 7%. He asks the shopkeeper to reduce the price of radio so that, he can save the amount equal to the sales tax. The reduction of the price of the radio is :
 (a) Rs 180 (b) Rs 210
 (c) Rs 168 (d) none of these

Direction for Question (79-81):- Read the following passage and answer the questions.

In a recent youth fete organised by Rakesh Yadav Reader's Publication the entry tickets were sold out according to the following scheme:

Tickets bought in one lot
 6, 12, 18 Percentage discount 10%
 20% 25% Original price per ticket:
 Rs. 40

This offer could have been availed only when tickets were bought in a fixed lot according to the scheme and any additional ticket was available at its original price.

79. If a student has to buy 25 tickets, then what will be the minimum price per ticket ?
 (a) Equal to Rs 32
 (b) 32.32

- (c) 31.84
 (d) Cannot be determined
80. In the above question, what will be the approximate possible maximum price per ticket (if 10% discount have been availed for 24 tickets) ?
 (a) Rs. 30 (b) Rs. 32
 (c) Rs. 36 (d) Rs. 36.16
81. On the last day of the fete, with the objective of maximising participation, the number of tickets sold in a lot was halved with the same discount offer. Mr. Bhuvnesh is in a fix regarding the number of tickets he can buy with Rs. 532. The maximum number of tickets he can purchase with this money is
 (a) 14 (b) 15
 (c) 16 (d) 17
82. Of the adult population in Delhi, 45% of men and 25% of women are married. What percentage of the total population of adults is married (assume that no man marries more than one woman and vice versa) ?
 (a) 33.33% (b) 32.14%
 (c) 31.1% (d) None of these
83. The weight of an iron bucket increases by 33.33% When filled with water to 50% of its capacity. Which of these may be 50% of the weight of the bucket when it is filled with water (assume the weight of bucket and its capacity in kg to be integers)?
 (a) 7 kg (b) 6 kg
 (c) 5 kg (d) 8 kg
84. Australia scored a total of x runs in 50 overs. India tied the scores in 20% less overs. If India's average run rate had been 33.33% higher the scores would have been tied 10 overs earlier. Find how many runs were scored by Australia.
 (a) 250 (b) 240
 (c) 200
 (d) Cannot be determined



85. Due to a 25% hike in the price of rice per kilogram, a person is able to purchase 20 kg less for Rs. 400. Find the increased price per kilogram.
(a) Rs 5 (b) Rs 6
(c) Rs 10 (d) Rs 4
86. Rakesh Yadav is appointed on the basic salary of Rs. 1200 per month and the condition that for every sales of Rs. 10,000 above Rs. 10,000, he will get 50% of basic salary and 10% of the sales as a reward. This incentive scheme does not operate for the first Rs. 10000 of sales. What should be the value of sales if he wants to earn Rs. 7600 in a particular month?
(a) Rs 60,000 (b) Rs 50,000
(c) Rs 40,000 (d) None of these
87. In Question 87 Which of the following income can not be achieved in a month ?
(a) Rs 6,000
(b) Rs 9,000
(c) Both a and b
(d) Any income can be achieved
88. In an examination a candidate must score 40% marks to pass. A candidate, who gets 220 marks, fails by 20 marks. What are the maximum marks for the examination ?
(a) 1200 (b) 800
(c) 600 (d) 450
89. A family's ratio of savings to expenditure for last month was 2 : 13. This month, due to unforeseen expenditure, savings fell to 50% of the amount saved last month. Salary, last month was Rs. 10,000. This month there was increase of 15% in the salary. How much did the family spend this month?
(a) Rs. 667.33
(b) Rs. 11,167.33
(c) Rs. 9,833.33
(d) Rs. 10,833.33
90. The price of raw materials has gone up by 15%, labour cost was 25% on old price of raw material and now labour cost is 30% on new price of raw material. By how much percentage should there be a reduction in the usage of raw materials so as to keep the cost same?
(a) 16.38% (b) 18.24 %
(c) 28 % (d) 25 %
91. Mr. Rakesh Yadav is a computer programmer. He is assigned three jobs for which time allotted is in the ratio of 5 : 4 : 2 (jobs are needed to be done individually). But due to some technical snag, 10% of the time allotted for each job gets wasted. Thereafter, owing to the lack of interest, he invests only 40%, 30%, 20% of the hours of what was actually allotted to do the three jobs individually. Find how much percentage of the total time allotted is the time invested by X.
(a) 38.33% (b) 39.4545%
(c) 32.72% (d) 36.66%
92. In the Mock SSC paper , questions were asked in five sections. Out of the total students, 5% candidates cleared the cut-off in all the sections and 5% cleared none. Of the rest, 25% cleared only one section and 20% cleared four sections. If 24.5% of the entire candidates cleared two sections and 300 candidates cleared three sections, find out how many candidates appeared at the Mock SSC?
(a) 1000 (b) 1200
(c) 1500 (d) 2000
93. There are three galleries in a coal mine. On the first day, two galleries are operative and after some time, the third gallery is made operative. With this, the output of the mine became half as large again. What is the capacity of the second gallery as a percentage of the first, if it is given that a four-month output of the first and the third galleries was the same as the annual output of the second gallery?
(a) 70% (b) 64%
(c) 60% (d) 65%
94. Rakesh Yadav has some amount with him 25% of it is stolen in a bus, 10% is lost through a hole in the pocket, 50% of the remaining is spent on food. He then, purchases a book worth Rs. 26 from the remaining. He walks back home because all his money is over. What was the initial amount?
(a) Rs. 160 (b) Rs. 1230
(c) Rs. 90 (d) Rs. 80
95. In an election there are 3 candidates Rakesh Yadav, Bhuvnesh and Saurabh. Rakesh Yadav gets 50% more votes than Bhuvnesh. Rakesh Yadav also beats Saurabh by 1,80,00 votes. If it is known that, Bhuvnesh gets 5 percentage point more votes than Saurabh, find the number of voters on the voting list (given 90% of the voters on the voting list voted and no votes were illegal.)
(a) 72,000 (b) 81,000
(c) 90,000 (d) 1,00,000
96. The petrol prices shot up by 7% as a result of the hike in the price of crudes. The price of petrol before the hike was Rs. 28 per litre. Vawal travels 2400 kilometres every month and his car gives a mileage of 18 kilometres to a litre. Find the increase in the expenditure that Vawal has to incur due to the increase in the price of petrol (to the nearest rupee)?
(a) Rs. 270 (b) Rs. 262
(c) Rs. 276 (d) Rs. 272



97. A shopkeeper announces a discount scheme as follows : for every purchase of Rs. 3000 to 6000, The customer gets a 15% discount of a ticket that entitles him to get a 7% discount on a further purchase of goods costing more than Rs. 6000. The customer, however, would have the option of reselling his right to the shopkeeper at 4% of his initial purchase value (as per the right refers to the 7% discount ticket.) In an enthusiastic response to the scheme, 10 people purchase goods worth Rs. 4000 each. Find the maximum, possible revenue for the shopkeeper.
(a) Rs. 38,400 (b) Rs. 38,000
(c) Rs. 39,400 (d) Rs. 39,000
98. Rakesh Yadav has 72% vision in his left eye and 68% vision in his right eye. On corrective therapy, he starts wearing contact lenses, which augment his vision by 15% in the left eye and 11% in the right eye. Find out the percentage of normal vision that he possesses after corrective therapy. (Assume that a person's eyesight is a multiplicative construct of the eyesight's of his left and right eyes)
(a) 52.5% (b) 62.5%
(c) 72.5% (d) 68.6%
99. The sum of the numbers of boys and girls in a school is 150. If the number of boys is x , the number of girls becomes $x\%$ of the total number of students. The number of boys is :
(a) 90 (b) 50
(c) 40 (d) 60
100. The population of Mukherjee Nagar is 700. If it increases by 7.14% per annum (i.e., every year). Find the population of the Mukherjee Nagar after one year.
(a) 630 (b) 490
(c) 750 (d) 980
101. A cricket team played 24 matches. The team won 9 matches and lost 3 matches. 12 matches ended in draw. What per cent of the total matches did the team lose ?
(a) $16\frac{2}{3}\%$ (b) $12\frac{1}{2}\%$
(c) 25% (d) $33\frac{1}{3}\%$
102. Rakesh Yadav gives 10% to his wife, 10% of the remaining to a hospital (as a donation) and gain 10% of the remaining to prime minister's relief Fund. Then he has only 7290 Rs. with him. What was the initial sum of money of Rakesh Yadav.
(a) 8,100 (b) 9,000
(c) 12,00 (d) 10,000
103. Initially Rakesh Yadav had n chocolates. A customer bought 10% chocolate from n then another customer bought 20% of the remaining chocolates, after that one more customer purchased 25% of the remaining chocolates. Finally Rakesh Yadav is left with 270 chocolates in his shop. How many chocolates were there initially in his shop?
(a) 300 (b) 450
(c) 500 (d) 600
104. Bhuvnesh is a very expert in bargaining. Once he went to a nearby shop. When Bhuvnesh asked the price of Shampoo the shopkeeper told her the price by increasing 15% of the original cost. But Bhuvnesh insisted to decrease the price by 15% so the shopkeeper sold it by decreasing the price by 15%. What is the loss or profit of shopkeeper and by how much percent?
(a) No loss (b) profit of 1.5%
(c) loss of 2.25%
(d) None of these
105. A's salary is half that of B. If A got a 50% rise in his salary and B got a 25% rise in his salary, then the percentage increase in combined salaries of both is.
(a) 30% (b) 33.33%
(c) 55% (d) 28%
106. In our Mukherjee Nagar's office there are 60% female employees. 50% of all the male employees are computer literate. If there are total 62% employees computer literate out of the total 1600 employees, then the no. of female employees who are computer literate:
(a) 690 (b) 672
(c) 960
(d) Can't be determined
107. A shopkeeper charges sales tax of $x\%$ up to Rs. 2,000 and above it he charges $y\%$. A customer pays total tax of Rs 320, when he purchases the goods worth Rs. 6,000 and he pay's the total tax of Rs. 680 for the goods worth Rs. 12,000. The value of $(x - y)$ is:
(a) 0 (b) - 2
(c) - 4 (d) 5
108. 40% of a number when added to the square of the same number, then it is increased to 4040% of itself the actual number is:
(a) 175 (b) 400
(c) 40 (d) 120
109. 600 students took the test on physics and chemistry. 35% students failed in Physics and 45% students failed in chemistry and 40% of those who passed in chemistry also passed in Physics, then how many students failed in both:
(a) 162 (b) 138
(c) 60 (d) None of these
110. Rakesh Yadav's salary is Rs. 12,345 per month. The salary of his brother is 10% greater



than that of his salary. The salary of his only sister is 9.09% greater than his only brother. The salary of his wife is

$56\frac{12}{23}\%$ less than the total

salary of his brother and sister together, then the salary of his wife is:

(a) greater than his sister's salary

(b) $33\frac{11}{23}\%$ less than his sister's salary

(c) equal to his salary

(d) $44\frac{11}{23}\%$ greater than his own salary

111. NDTV is a very popular TV channel. It telecasts the programmes from 8:00 a.m. to 12:00 a.m. (Midnight). It telecasts 60 advertisements each of 8 seconds and 16 advertisements each of 30 seconds. What is the percentage of time devoted in a day for the advertisements ?

- (a) 1.5% (b) 1.66%
(c) 2% (d) 2.5%

112. Lagaan is levied on the 60% of the cultivated land. The revenue department collected total Rs. 3,84,000 through the lagaan from the village of Rakesh Yadav. Rakesh Yadav, a very rich farmer, paid only Rs. 480 as lagaan. The percentage of total land of Rakesh Yadav over the total taxable land of the village is:

- (a) 0.15% (b) 1.5%
(c) 0.125% (d) 0.208%

113. The cost of packaging of the mangoes is 40% the cost of fresh mangoes themselves. The cost of mangoes increased by 30% but the cost of packaging decreases by 50%, then the percentage change of the cost of packed mangoes, if the cost of packed mangoes is equal to the sum of the cost of fresh mangoes and cost of packaging.

- (a) 14.17% (b) 7.14%
(c) 6.66% (d) None of these

114. Bhuvnesh scores 80% in Physics and 66% in chemistry and the maximum marks of both the papers are 100. What per cent does he score in maths which is of 200 marks, if he scores 80% marks in all the three subjects:

- (a) 74% (b) 84%
(c) 87% (d) 83%

115. Three candidates A, B and C contested an election. Out of the total votes on a voter list 25% did not vote and 6.66% votes polled were invalid. C got 2450 valid votes, which were 40% more than that of B. If A got only 40% of the total votes, then who is the winner ?

- (a) A (b) B
(c) C
(d) can't be determined

116. The monthly salary of Bhuvnesh and Saurabh together is \$ 28,000. The salary of Bhuvnesh and Saurabh is increased by 25% and 12.5% respectively then the new salary of Saurabh becomes 120% of the new salary of Bhuvnesh. The new (or increased) salary of Bhuvnesh is:

- (a) \$ 15,000 (b) \$ 18,000
(c) \$ 14,000 (d) \$ 16,000

117. The shopkeeper increased the price of a product by 25% so that customer finds it difficult to purchase the required amount. But somehow the customer managed to purchase only 70%

of the required amount. What is the net difference in the expenditure on that product ?

- (a) 10% more (b) 5% more
(c) 12.5% less (d) 17.5% less

118. In the previous government, party Q was in the opposition. Now increasing the seats by 33.33% Q is the ruling party and thus party Q enjoys twice the majority than that of party P in the previous government. If there were only two parties P and Q and the fix no. of seats be 500 in the parliament of Hum-Tum, then the no. of seats of the Q in the new government is:

- (a) 225 (b) 200
(c) 275 (d) 300

119. In a school there are 1800 students. Last day except 4% of the boys all the students were present in the school. Today except 5% of the girls all the students are present in the school, but in both the days no. of students present in the school, were same. The no. of girls in the school is :

- (a) 1200 (b) 800
(c) 1000 (d) 600

120. In a test there are total n questions. Rakesh Yadav answers 20 out of 25 questions correctly in the first section. In the second section he answers 60% question correct and thus his total score is 66.66% in the test. Given that all the questions carry equal marks, without any negative marking. The total no. of question in the test is :

- (a) 50 (b) 60
(c) 75 (d) 100

121. Radha spends 40% of her salary on food, 20% on house rent, 10% on entertainment and 10% on conveyance. If her savings at the end of a month are Rs. 1500, then her salary per month (in Rs.) is :

- (a) 8000 (b) 7500
(c) 6000 (d) 10000



122. In an election between two candidates, one got 55 % of the total valid votes, 20 % of the votes are invalid. If the total votes are 75000, what is the number of valid votes that the other person got ?
 (a) 2700 (b) 2900
 (c) 3000 (d) 3100
123. A Rakesh Yadav gets commission on total sales at 9%. If the sales is exceeded Rs. 10,000 he gets an additional commission as bonus of 3% on the excess of sales over Rs. 10,000. If he gets total commission of Rs. 1380, then the bonus he received is:
 (a) Rs. 180 (b) Rs. 120
 (c) Rs. 480
 (d) Data insufficient
124. A businessman's earning increases by 25 % in one year but decreases by 4 % in the next. After 5 years his total earnings would be Rs. 72,000. What is his present earning?
 (a) Rs. 10,000 (b) Rs. 40,000
 (c) Rs. 80,000 (d) Rs. 54,000
125. A man invests Rs. 1,200 at 10 % p.a. At the end of the year he withdraws 30 % of total amount and pays Rs. 24 as transaction fee. At the end of 2nd year he withdraws 30 % of the amount and pays Rs. 93 as transaction fee. What is the balance at the end of the third year?
 (a) Rs. 660 (b) Rs. 825
 (c) Rs. 500 (d) Rs. 770
126. The average earning of each member of the Ambani family is 20% less than the average earnings of each member of the Sahara family and the total earnings of Ambani's family is 20% more than the total earning of Saharas's family. The no. of family members in the Sahara is what per cent of the no. of family members of Ambani:
 (a) 25% (b) 20%
 (c) 66.66% (d) None of these
127. From 2000 onwards, till 2003 the price of computers increased every year by 10%. After that due to government subsidy the price of computers decreases every year by 10%. The price of a computer in 2006 will be approx. how much per cent less than the price in 2000 if the same pattern of price is continued:
 (a) 2 (b) 3
 (c) 4 (d) None of these
128. A book consists of 30 pages, 25 lines on each page and 35 characters on each line. If this content is written in another note book consisting of 30 lines and 28 characters per line, then the required no. of pages will how much per cent greater than the previous pages ?
 (a) 4.16% (b) 5%
 (c) 6.66% (d) None of these
129. The rate of increase of the price of sugar is observed to be 2% more than the inflation rate expressed in percentage. The price of sugar on January 1, 2004 is Rs. 20 per kg. The inflation rates of the years 2004 and 2005 are expected to be 8% each. The expected price of sugar on January 1, 2006 would be:
 (a) Rs. 23.60 (b) Rs. 24.00
 (c) Rs. 24.20 (d) Rs. 24.60
130. In the Regional Science Centre, Lucknow the rate of ticket is increased by 50% to increase the revenue, but simultaneously 20% of the visitors decreased. What is percentage change in the revenue of Regional Science Centre.
 (a) + 20% (b) - 25%
 (c) + 30%
 (d) Can't be determined
131. On Jan 1, 2014 my salary decreased from Rs. 20,000 to Rs. 18,000. Simultaneously the rate of income tax decreased by 37.5 %. If so the amount of income tax paid by me remains constant, what is the value of income tax I pay :
 (a) Rs. 6,000 (b) Rs. 12,000
 (c) Rs. 8,000
 (d) can't be determined
132. Selling price of a shirt and a coat is Rs. 4000. The cost price of a shirt is 58.33% of the cost price of a coat and so amount of profit on both the shirt and coat is same, then the price of the shirt could be : (a) Rs. 2100
 (b) Rs. 2525
 (c) Rs. 2499 (d) Rs. 1120
133. On the April 1, 2005 my salary increased from Rs. 10,000 to Rs. 16,000. Simultaneously the rate of income tax decreased by 37.5%, So the amount of income tax paid by me remains constant what is the value of income tax paid by me:
 (a) Rs. 3000 (b) Rs. 6000
 (c) Rs. 1600
 (d) Can't be determined
134. In a class, the no. of boys is more than the no. of girls by 12%. The ratio of boys to girls is:
 (a) 15 : 11 (b) 14 : 11
 (c) 25 : 28 (d) 28 : 11
135. A customer asks for the production of x number of goods. The company produces y number of goods daily. Out of which $z\%$ are unfit for sale. The order will be completed in:
 (a) $\frac{x}{100y(1-z)}$ days
 (b) $\frac{100yz}{x}$ days
 (c) $\frac{100x}{y(100-z)}$ days
 (d) $\frac{100}{y(z-1)}$ days



136. In a town, the population was 8000. In one year, male population increased by 10% and female population increased by 8% but the total population increased by 9%. The number of males in the town was:
 (a) 4,000 (b) 45,000
 (c) 5,000 (d) 6,000
137. A fraction is reduced such that when it is squared and then its numerator is increased by 25% and the denominator is reduced to 80% it results in $\frac{5}{8}$ of the original fraction. The product of the numerator and denominator is:
 (a) 6 (b) 12
 (c) 10 (d) 7
138. In the Yadav's family the ratio of expenses to the savings is 5 : 3. But his expenses is increased by 60% and income increases by only 25% thus there is a deficit of Rs. 3500 in savings. The increased income of Rakesh Yadav's family is :
 (a) Rs. 35,000 (b) Rs. 28,000
 (c) Rs. 25,000 (d) Rs. 18,500
139. In the Presidency College two candidates contested a presidential election. 15% of the voters did not vote and 41 votes were invalid. The elected contestant got 314 votes more than the other candidate. If the elected candidate got 45% of the total votes in the voting list. The individual votes of each candidates are :
 (a) 2250 and 1936
 (b) 3568 and 3254
 (c) 2442 and 2128
 (d) 2457 and 2143
140. The annual earning of Mr. Rakesh Yadav is Rs. 4 lakhs per annum for the first year of his job and his expenditure was 50%. Later on for the next 3 years his average income increases by Rs. 40,000 per annum and the saving was 40%, 30% and 20% of the income. What is the percentage of his total savings over the total expenditure if there is no interest is applied on the savings for these four years.
 (a) $49\frac{37}{87}\%$ (b) $41\frac{73}{83}\%$
 (c) 53% (d) None of these
141. In an election only two candidates contested 20% of the voters did not vote and 120 votes were declared as invalid. The winner got 200 votes more than his opponents thus he secured 41% votes of the total voters on the voter list. Percentage votes of the defeated candidate out of the total votes casted is:
 (a) 47.5% (b) 41%
 (c) 38% (d) 45%
142. A, B, C and D purchased a Batra-multiplex for Rs. 56 lakh. The contribution of B, C and D together is 460% that of A, alone. The contribution of A, C and D together is 366.66% that of B's contribution and the contribution of C is 40% that of A, B and D together. The amount contributed by D is :
 (a) 10 Lakh (b) 12 Lakh
 (c) 16 Lakh (d) 18 Lakh
143. In a village three people contested for the post of village Pradhan. Due to their own interest, all the voters voted and no one vote was invalid. The losing candidate got 30% votes. What could be the minimum absolute margin of votes by which the winning candidate led by the nearest rival, if each candidate got an integral per cent of votes ?
 (a) 4 (b) 2
 (c) 1 (d) None of these
144. Every day a mango seller sells half his stock, 10% of the stock overnight gets spoiled. If 1983 mangoes rotted over 3 nights then how many did he start with on the first day ?
 (a) 25,000 (b) 24,000
 (c) 30,000 (d) 32,000
145. A man lost half of his initial amount in the gambling after playing 3 rounds. The rule of gambling is that if he wins he will receive Rs. 100, but he has to give 50% of the total amount after each round. Luckily he won all the three rounds. The initial amount with which he had started the gambling was :
 (a) $\frac{500}{3}$ (b) $\frac{700}{3}$
 (c) 300 (d) 600
146. The price of an article was decreased by 10% and again reduced by 10%. By what percent should the price have been reduced once, in order to produce the same effect as these two successive reductions?
 (a) 15 (b) 19
 (c) 20 (d) 25
147. 8% of the voters in an election did not cast their votes. In this election, there were only two candidates. The winner by obtaining 48% of the total votes defeated his contestant by 1100 votes. The total number of voters in the election was:
 (a) 21000 (b) 23500
 (c) 22000 (d) 27500
148. In every month Rakesh Yadav consumes 25 kg rice and 9 kg wheat. The price of rice is 20% of the price of wheat and thus he spends total Rs. 350 on the rice and wheat per month. If the price of wheat is increased by 20% then what is the percentage reduction of rice consumption for the same expenditure of Rs. 350 ? Given that the price of rice and consumption of wheat is constant.
 (a) 36% (b) 40%
 (c) 25% (d) 24%



149. A person gave 20% of his income to his elder son, 30% of the remaining to the younger son and 10% of the balance, he donated to a trust. He is left with Rs. 10080. His income was :
- (a) Rs. 50000 (b) Rs. 40000
(c) Rs. 30000 (d) Rs. 20000
150. P% of the students of a class passed the exam. In the passed students g% are the girls and in the failed students b% are the boys. The percentage of passed boys over the failed girls is:
- (a) $\left(\frac{bg}{p} \times 100\right)$
(b) $\frac{100(100 - g)p}{(100 - p)(100 - b)}$
(c) $\frac{(100 - g)(100 - b)}{(100 - p)}$
(d) None of these
151. In an election between two candidates, 75% of the voters cast their votes, out of which 2% votes declared invalid. A candidate got 9261 votes which were 75 % of the valid votes. The total number of voters enrolled in that election was:
- (a) 16000 (b) 16400
(c) 16800 (d) 18000
152. Two numbers are in the ratio 2 : 3. If the 20 % of the smaller number added to 20 is equal to the sum of 10% of the larger number and 25, then the smaller number is :
- (a) 100 (b) 160
(c) 180 (d) 200
153. The pressure of a definite mass of a gas is directly proportional to the temperature and inversely proportional to the volume under the given conditions. If temperature is increased by 40% and the volume is decreased by 20% then the new pressure will :
- (a) increased by 75%
(b) reduce to 25%
(c) increased by 20%
(d) increased by 28%
154. A computer typist types a page with 20 lines in 10 minutes but he leaves 8 % margin on the left side of the page. Now he has to types 23 pages with 40 lines on each page and leaves 25% more margin than before. How much time is now required to type these 23 pages.
- (a) $7\frac{1}{2}$ hrs (b) $7\frac{2}{3}$ hrs
(c) $23\frac{1}{2}$ hrs (d) 3.916 hrs
155. In Sabarmati Express, there are as many wagons as there are the no. of seats in each wagon and not more than one passenger can have the same berth (seat). If the middlemost compartment carrying 25 passengers is filled with 71.428% of its capacity, then find the maximum no. of passengers in the train that can be accommodated if it has minimum 20% seats always vacant.
- (a) 500 (b) 786
(c) 980
(d) Can't be determined
156. In the half yearly exam only 70% of the students were passed. Out of these (passed in half yearly) only 60% student are passed in annual exam. Out of those who did not pass the half yearly exam, 80% passed in annual exam. What per cent of the students passed the annual exam?
- (a) 42% (b) 56%
(c) 66% (d) None of these
157. The monthly income of a person was Rs. 13,500 and his monthly expenditure was Rs. 9,000. Next year his income increased by 14 % and his expenditure increased by 7%. The percent increase in his savings was :
- (a) 7 (b) 21
(c) 28 (d) 35
158. In an office there were initially n employees. The HR manager first hired p% employees then after a month q% employees left the office, then there were finally n employees remained in the office, the value of p - q is:
- (a) pq (b) $\frac{pq}{100}$
(c) $\frac{p}{q}$ (d) None of these
159. In the Mukherjee Nagar, Delhi a shopkeeper first raises the price of a Jewellery by x % then he decreases the new price by x %. After one such up down cycle, the price of a Jewellery decreased by Rs. 21025. After a second updown cycle the jewellery was sold for Rs. 484416. What was the original price of the jewellery.
- (a) Rs. 5,00,000
(b) Rs. 6,00,625
(c) Rs. 5,25,625
(d) Rs. 5,26,000
160. The amount of work in Rakesh Yadav Readers Publication is increased by 50%. By what per cent is it necessary to increase the number of workers to complete the new amount of work in previously planned time, if the productivity of the new labour is 25% more.
- (a) 60% (b) 66.66%
(c) 40% (d) 33.33%
161. The number of students who opted for IT course decreased by 23%. If the number is 1540 now, then original number of students opting for IT course was:
- (a) 1,600 (b) 1,800
(c) 2,000 (d) 2,200



162. If the height of a cone is increased by 200%, then its volume will be increased by:
 (a) 100% (b) 200%
 (c) 250% (d) 300%
163. In an examination A got marks 10% less than B, B got marks 25% more than C, C got marks 20% less than D. If A got 360 marks out of 500, then D got marks:
 (a) 70% (b) 75%
 (c) 80% (d) 85%
163. An increase of 25% in entrance fee in a show follows a decrease of 30% in the number of daily viewers. What is the effect of this on total revenue?
 (a) Decrease $8\frac{1}{2}\%$
 (b) Increase $8\frac{1}{2}\%$
 (c) Increase $12\frac{1}{2}\%$
 (d) Decrease $12\frac{1}{2}\%$
164. According to survey, there are 2 or more persons in 40% houses, out of the houses with one person, there was one man only in 25% houses. Find the percentage of those houses in which there live only one woman and no man out of all the houses.
 (a) 75 (b) 40
 (c) 15 (d) 45
165. The marks of Bhuvnesh in Chemistry are 60% of the marks in Mathematics and marks in Mathematics are 60% of the marks in Physics. How many marks he got in Chemistry, if the marks in these three subjects are 147 in all?
 (a) 27 (b) 45
 (c) 75 (d) None of the above
166. Daily wages of A, B and C are Rs. 333. If they spend 80% 85% and 75% of their wages, respectively, then their savings are in the ratio of 7 : 6 : 9. What are the daily wages of B?
 (a) Rs. 120 (b) Rs. 105
 (c) Rs. 108 (d) Rs. 115
167. In a Rakesh Yadav Readers Publication 40% books are of English, 80% of the rest books are of Hindi and remaining 300 books are of other languages. The number of books in the Publication is :
 (a) 2,000 (b) 1,500
 (c) 2,500 (d) 3,500
168. In an election between two candidates, first candidate got 80% of the total valid votes. If 10% of the total 1,80,000 votes were declared invalid, then the number of valid votes polled in favour of the second candidate is
 (a) 31,400 (b) 31,500
 (c) 32,400 (d) 32,420
169. The number of seats in a cinema hall is increased by 25%. the cost of a ticket is also increased by 10%. The overall percentage increase in the revenue is:
 (a) 10.5 (b) 27.5
 (c) 37.5 (d) 40.5
170. Bhuvnesh invests 7% (i.e., Rs. 2,170) of his monthly income in Mutual Fund. After that 18% of his income invests in Recurring Deposit Account. He invests 6% of his income in NSC. What is the annual investment of Bhuvnesh.
 (a) Rs. 1,25,320
 (b) Rs. 1,13,520
 (c) Rs. 1,35,120
 (d) Rs. 1,15,320
171. In an Examination the first student got 28% marks and failed by 12 marks. While in the same examination the second student got 30% marks and failed by 6 marks. Find the the maximum marks in the examination and also find minimum pass marks—
 (a) 200, 66 (b) 300, 96
 (c) 500, 156 (d) 1000, 306
172. In an examination a student got 32% marks and failed by 4 marks. While another student got 35% marks and got 5 marks more than pass marks. Find the maximum marks in the examination.
 (a) 500 (b) 200
 (c) 300 (d) None of these
173. Rakesh Yadav spends 18% of his income on food and education, 25% on house and transportation, 24% on insurance and he deposits 20% in the bank if he is left with Rs. 19500 then find his total income.
 (a) 1,00,000 (b) 2,00,000
 (c) 4,00,000 (d) 1,50,000
174. A person gives 40% of his income to A and then he gives 25% of the remaining to B and again he gives 50% on the remaining to C. If he is left with Rs. 2160, find his total initial income?
 (a) 8,000 (b) 9600
 (c) 10,000 (d) 8500
175. In an examination 65% students failed in Maths and 75% students failed in English while 52% students failed in both the subjects. If 48 students passed in both the subjects then find the total number of students appeared in the examination.
 (a) 400 (b) 500
 (c) 200 (d) None of these
176. In a group every person takes either tea or coffee or both. If 72% persons take tea and 44% persons take coffee. If there are 192 persons who take both tea and coffee, then find total number of persons in the group.
 (a) 1000 (b) 1200
 (c) 1500 (d) 800
177. In a fraction the numerator is 4 less than its denominator. If the numerator is increased by 32% and the denominator is



increased by 75% then the resultant fraction becomes

$\frac{12}{25}$. Find the original fraction.

(a) $\frac{3}{7}$ (b) $\frac{5}{9}$

(c) $\frac{7}{11}$ (d) $\frac{9}{13}$

178. If the price of sugar is decreased by 20%, a person can buy 2 kg more sugar for 360 rupees. Find the original and present price of sugar/kg.

- (a) 45, 36 (b) 40, 32
(c) 30, 24 (d) 60, 48.

179. In an exam a student got 32.2% marks and he was failed by 28 marks. While an another student got 45% marks and he passed getting 36 marks more than minimum marks required to pass. Find the minimum marks percentage required to pass in the exam.

- (a) 37% (b) 37.8%
(c) 40% (d) 40.5%

180. In an exam 900 girls 1100 boys appeared. In which 40% of girls and 50% of the boys passed the exam. Find the percentage of failed students.

- (a) 45 (b) 45.5
(c) 54.5 (d) 59.2

181. Rakesh Yadav spends 20% of his salary on the education of his son. In the next month when his salary increases by 170 rupees he decides to spend half of the increased also on the education of his son. In this way his present expenditure on son's education becomes Rs. 645. Find his initial salary.

- (a) Rs. 2400 (b) Rs. 2600
(c) Rs. 2800 (d) Rs. 3600

182. In an examination there are three subjects Geography, History and Sanskrit having maximum marks 120, 140, 100 respectively. A student gets 40%, 55% and 45% in Geography, History and Sanskrit respectively. If he wants to get 60% marks in four subjects then how many marks he must obtain in maths of maximum marks 180?

- (a) 127 (b) 133
(c) 154 (d) 160

183. When a train starts it is carrying 240 passengers. At the first station 12 passengers got down and 22 passengers get into the train. At the second station 20% of the passengers got down and at the third station 32 passenger get into the train and some passenger got down and now finally there are 80% passengers in the train. Find the number of passenger who got down at the third station.

- (a) 44 (b) 40
(c) 30 (d) 26

184. If the price of edible items has been increased by 10% and the price of other commodities is increased by 15%. If the ratio of expenditure on edible items and other commodities of a person be 2:5 and his salary be Rs. 3500. Then how many rupees must be increased in his salary so that he can consume the same quantity as before

- (a) 300 (b) 350
(c) 375 (d) 475

185. Three shopkeepers promised to sell their goods at the marked price. A gives two successive discounts of 25% and 15%, B gives two successive discounts of 10% and 30% while C gives a single discount of 36%. Whose scheme is the best for customer?

- (a) A (b) B
(c) C (d) A, B and C all

186. In a 200 grams mixture of water, spirit and alcohol the quantity of water, spirit, alcohol are 20%, 30% and 50% respectively. If 20 gm alcohol is added to the mixture and the quantity of water be doubled in the mixture then find their respective ratio of their quantities in the mixture.

- (a) 4 : 3 : 6
(b) 2 : 3 : 4
(c) 4 : 4 : 7
(d) None of these

187. In an election there were only three candidates. 10% of the total votes could not be cast and 10,000 votes were found invalid. The winning candidate got 52% of the valid votes and the candidate at third position got 12% votes. If the candidate at second position got 28800 votes, then find the total number of votes.

- (a) 90,000
(b) 99000
(c) 1,00,000
(d) None of these

188. In an election there are three candidates. The winning candidate got 55% votes and the candidate at the third place got 5% of the votes. If the winning candidate win by 9000 votes then find total number of votes while no vote was invalid.

- (a) 60,000 (b) 12,000
(c) 48,000 (d) 50,000

189. While measuring the base of triangle it has been taken in 40% excess and its height was measured 40% less. Find the percentage change in its area.

- (a) 16% increase
(b) 16% decrease
(c) 4% increase
(d) 4% decrease



190. An M.B.A student got a job in a company on the condition that he will be paid a salary of Rs. 2700 per month and $6\frac{1}{4}\%$ commission on the total sales made by him. If in a month he got Rs. 18325 then find the total sales made by him during that month.
(a) 2,00,000 (b) 2,50,000
(c) 2,60,000 (d) 2,70,000
191. In a training institute every trainee has to secure a minimum of 50% marks to pass. If a trainee got 163 marks and failed by 37 marks then find maximum marks in the exam.
(a) 200 (b) 300
(c) 400 (d) 500
192. If the ratio of length, breadth and height of cuboid is 1:2:3. If the length, breadth and height are increased by 100%, 200% and 200% respectively. Then how much the volume of the cuboid will increase?
(a) 5 times (b) 6 times
(c) 12 times (d) None of these
193. In a co-educational school the number of girls is 15 more than that of boys. If the number of girls increase by 10% and the number of boys increase by 16% then the difference between number of girls and boys remains 9. Find the total number of students in the school.
(a) 140 (b) 125
(c) 265 (d) 255
194. A man orders 4 pairs of black shocks and some pairs of brown shocks. the price of black pair is double that of brown pair. While billing the clerk interchanged the number of pair of black and brown shocks and hence the total amount of bill increased by 50%. Find the ratio of pair of black and brown shocks initially.
(a) 4 : 1 (b) 2 : 1
(c) 1 : 4 (d) 1 : 2
195. The price of a weekly magazine be Rs. 90. There is a 30% discount on becoming a customer of 51 magazines while a 25% discount to the customer of 26 magazines. Find the difference of the price of a magazine for a customer of 51 magazines and a customer of 26 magazines.
(a) Rs. 4.50 (b) Rs. 3.50
(c) Rs. 5.50 (d) Rs. 4.30
196. A salesman gets 10% commission on the total sales and an extra bonus of 2.5% on the sale above Rs. 10,000. If he earns 2,875 rupees. Find the total sales.
(a) 15,000 (b) 20,000
(c) 25,000 (d) None of these
197. A student was asked to measure the sides of a rectangle but by mistake he measured the length by 20% less and increased the breadth by 10%. If the area of the rectangle be 200 cm^2 . Then find the new area of rectangle.
(a) 176 cm^2 (b) 206 cm^2
(c) 226 cm^2 (d) 316 cm^2
198. The price of a chair is 400 rupees more than that of a table. If the price of 6 chairs and 6 tables be Rs. 4800. Then find how much percentage the price of a table is less than that of a chair.
(a) $\frac{200}{3}\%$ (b) 25 %
(c) $37\frac{1}{2}\%$ (d) None of these
199. The population of a town is 2,40,000 with 1,32,000 male population. If 90 male out of every 100 are literate. But the total literate population is 64%. Find the female literacy rate.
(a) $29\frac{9}{10}\%$ (b) 26%
(c) $32\frac{2}{9}\%$ (d) $16\frac{1}{3}\%$
200. In an exam $\frac{1}{20}$ part of the students attempted all 5 questions while $\frac{1}{20}$ part of the students did not attempt any questions. $\frac{1}{4}$ part of the remaining attempted only four questions while $\frac{1}{5}$ part students attempted only one question. If $24\frac{1}{2}\%$ of the total students attempted three questions and 200 students attempted only two questions. Find total no. of students.
(a) 1200 (b) 400
(c) 800 (d) 1600
201. Bhuvnesh purchased a house for Rs. 1,00,000 and give it on rent. He spends 12.5% of rent amount on the repair work and spends Rs. 325, per annum and then he earns a profit of 5.5% annually on his investment. Then find his monthly rent :
(a) Rs. 634.76 (b) Rs. 554. 76
(c) Rs. 654.76 (d) None of these
202. From the salary of an officer 10% is deducted for house rent. He spends 20% of the remaining on food. He pays 20% income tax of the remaining and he also spends 10% of the remaining on clothes. If at least he is left with Rs. 15552. Find his total salary.
(a) 25000 (b) 30,000
(c) 35,000 (d) 40,000



203. Rakesh Yadav bought a house for Rs. 5,00,000 and gives it on rent. Every year he spends

$12\frac{1}{2}\%$ of the total rent on

repairing work and gives Rs. 1660 as house tax, annually. If he receives 10% of his investment annually. Find the monthly rent of the house.

- (a) Rs. 2460 (b) Rs 2500
(c) Rs. 4920 (d) Rs. 5,000

204. In an examination there were

$37\frac{1}{2}\%$ girls. Only $62\frac{1}{2}\%$ of the

total girls and 75% boys were passed. If number of failed girls be 342 then find the number of failed boys

- (a) 350 (b) 360
(c) 370 (d) 380

205. 3 years before the population of a town was 1,60,000. If in the three successive years there was an increase of 3%, 2.5% and 5% respectively. Find the total present population of the town.

- (a) 1,77,000 (b) 1,77,366
(c) 1,77,461 (d) 1,77,596

206. A person started a factory after investing Rs. 1,00,000. At the end of first year he suffered a loss of 5%, at the end of second year he got a profit of 10% and if at the end of third year the person got a profit of 12%. Find his total profit after 3 years.

- (a) Rs. 12540 (b) Rs. 17040
(c) Rs. 22040 (d) Rs. 27040

207. In an election between two candidates, 10% of the voters did not cast their votes while 10% of the vote polled were declared invalid. If the winning

candidate got 54% of the valid votes and won by 1620 votes then find the total number of voters in the voter list.

- (a) 25,000 (b) 33,000
(c) 35,000 (d) 40,000

208. In an election 30% of the voters voted to A and 60% of the remaining voted to B. and the remaining did not cast their vote. If the difference of the number of voters voted to A and those who do not voted at all is 1200. If no vote was declared invalid. Find the number of voters who have the right to vote in this election.

- (a) 10,000 (b) 45,000
(c) 60,000 (d) 72,000

209. In a bag there are 600 coins of 25 paise and 1200 coins of 50 paise. If 12% coins of 25 paise and 24% coins of 50 paise are taken out the bag. Then find how much percentage of the total amount has been taken out from the bag?

- (a) 15.6% (b) 17.8%
(c) 21.6% (d) 30%

210. In an exam 70% of the students passed from school A. In school B, number of students appeared was 20% more than that of A and the number of passed student was 50% more than that of A. Find the percentage of students passed from school B.

- (a) 30% (b) 70%
(c) 78.5% (d) 87.5%

211. In a screw making factory out

of two workers $33\frac{1}{3}\%$ of the

total screw made by 1st worker in a day is equal to 50% of the total screw made by the second worker in a day. If the second worker can make 1500 screw everyday then find the total number of screw made by the first worker in a day.

- (a) 500 (b) 1000
(c) 2000 (d) 2250

212. An amount decreases 10% every year of its initial value. The present value of the amount is Rs. 8100, What was its value before 2 years?

- (a) Rs. 10,000

(b) Rs. $\left(\frac{90}{100}\right)^2 \times 8100$

(c) Rs. $\left(\frac{100}{110}\right)^2 \times 8100$

- (d) Rs. 9801

213. The number of people living in a town is 64,000. If the population increased by $2\frac{1}{2}\%$

per annum. Find the population of that town after 3 years.

- (a) 70,000 (b) 69,200
(c) 68,921 (d) 68,911

214. The population of a town was 8,000. After one year the population of male increased by 10% while that of female increased by 8% but the total population increased by 9%. Find the number of male initially.

- (a) 4,000 (b) 5,000
(c) 4,500 (d) 6,000s

215. A shopkeeper sold his cooler at 10% discount on the marked price. If he had given 12% discount on the marked price, the profit of the shopkeeper would have been Rs. 35 less. Find the marked price of the cooler.

- (a) Rs. 1650 (b) Rs. 1625
(c) Rs. 1725 (d) Rs. 1750

216. When water is freezed to ice its volume increased by 9%. If the ice is melted into water how much percent its volume will reduce.

- (a) 9% (b) 10%
(c) 18% (d) $8\frac{28}{109}$

217. Bhuvnesh gets some pocket money. He spends 20% on books and of the remaining amount he spends 25% on stationery. Now 10% of the



remaining he gives alms to the poor and in the last he purchases sweets of the left amount. If he spends Rs. 13.50 on sweets find his pocket money.

- (a) Rs. 20 (b) Rs. 25
(c) Rs. 30 (d) Rs. 45

218. 5% of Rakesh's income is equal to 15% of Bhuvnesh's income while 10% of Bhuvnesh's income is equal to 20% of Saurabh's income. If the Saurabh's income be 2000 rupees find the income of Rakesh's .

- (a) Rs. 20,000 (b) Rs. 12,000
(c) Rs. 15,000 (d) Rs. 25,000

219. What will be the percentage profit after selling an article at a certain price if there is a loss of 10%

when the article is sold at $\frac{3}{4}$ th of the previous selling price?

- (a) 10% (b) 20%
(c) 15% (d) 25%

220. 30 quintal is what percent of 2 metric tones ?

- (a) 15 (b) 1.5
(c) 150 (d) 3

221. If the sales tax of a commodity is decreased from $3\frac{1}{2}\%$ to

$3\frac{1}{3}\%$, then find the difference in cost price of a commodity which has Rs. 8400 marked price.

- (a) Rs. 20 (b) Rs. 15
(c) Rs. 14 (d) Rs. 10

222. When Rakesh Yadav was asked to draw an angle of 45° on paper, he draws an angle of $45^\circ 27'$. Find the percentage error made by Rakesh Yadav

- (a) 0.5% (b) 1.0%
(c) 1.5% (d) 2.0%

223. Present birth rate per thousand is 32 in a town the death rate per thousands is 11. Find the net increase (in percentage) in population of the town—

- (a) 21% (b) 2.1%
(c) 0.021% (d) .0021%

224. Marked price of a commodity is Rs. 500. A shopkeeper gives two successive discounts of 15% and 10% on it. While another shopkeeper gives two successive discounts of 9% and 16% on the same commodity. From which shopkeeper should a person buy the commodity to have maximum profit?

- (a) First Shopkeeper
(b) Second Shopkeeper
(c) Equal From both
(d) None of these

225. Ratio of expenditure and savings of Bhuvnesh is 5:3 If there is an increase of 12% in his income and an increase of 15% in his expenditure. Find the percentage increase in his savings:

- (a) 12% (b) 7%
(c) 8% (d) 13%

226. Due to an increase of 20% in the price of mangoes a person could buy 4 mangoes less for Rs. 40. Find the price of 15 mangoes before increment.

- (a) Rs. 10 (b) Rs. 15
(c) Rs. 20 (d) Rs. 25

227. In a village there are 45% females and remaining are males. Of the total females 20%

are married. $33\frac{1}{3}\%$ of the married females are government employee and 40% of the males are also government employee. Find how much percentage of the total population is unemployed?

- (a) 60% (b) 75%
(c) 80% (d) 88%

228. Rakesh Yadav gives 1% of his income to his two sons as pocket money every

months. The amount received by the sons, 80% goes to elder son and he spends 80% of this amount. If he saves Rs. 20 per month. Find the income of the Rakesh Yadav.

- (a) Rs. 10,000 (b) Rs. 11,500
(c) Rs. 12,000 (d) Rs. 12,500

229. When the price of rice was increased by 32%, a family reduced its consumption in such a way that the expenditure on rice was only 10% more than before. If 30 kg were consumed per month before, find the new monthly consumption.

- (a) 25 kg (b) 24 kg
(c) 20 kg (d) 18 kg

230. The population of Mukherjee Nagar is 4.2×10^6 . If there is a increase in population at the rate of 75 per thousand annually, Find the population of the Mukherjee Nagar after 2 years—

- (a) 48,53,625 (b) 58,53,615
(c) 46,33,628 (d) 52,53,495

231. Rakesh Yadav invests 10,000 rupees in two parts one at 5% and the other at 6%. The part invested at 5% produced 76.50 rupees more than the part invested at 6% produces. Find the amount invested at 6%

- (a) Rs. 3600 (b) Rs. 3550
(c) Rs. 3850 (d) Rs. 4000

232. In Rakesh Yadav Readers Publication, there is a increase of 25% in the number of employees working in it, while the salary has been decreased by 25% simultaneously. If there is a decrease of $x\%$ in the total wages then find the value of x ?

- (a) 0 (b) 25
(c) 20 (d) 25/4

233. Rakesh Yadav spends 5% of his income on insurance and 5% of the remaining paying as tax. Now he is left with 20 rupees more than 90% of his income. Find his income.

- (a) Rs. 6000 (b) Rs. 8,000
(c) Rs. 10,000 (d) Rs. 12,000



234. In a group of students, 70 % can speak English and 65 % can speak Hindi. if 27 % of the students can speak none of the two languages, then what per cent of the group can speak both the languages ?
 (a) 38 % (b) 62 %
 (c) 28 % (d) 23 %
235. The number of students in SSC School is increased by 20% this year. But the new law in the country made girls education free all over the country. So collect the same amount as in the previous year the college management increased the fee of boys by 25%. Then find the ratio of boys in comparison with the girls this year.
 (a) 2 : 1 (b) 1 : 2
 (c) 4 : 3 (d) 3 : 4
236. An amount of rupees 6100 is distributed among 8 men, 10 women and 12 children in such a way that a man gets 25% more than a woman and each woman gets 25% more than each child. Then find the amount received by each women.
 (a) Rs. 203.68 (b) Rs. 206.08
 (c) Rs. 206.68 (d) Rs. 201.69
237. In an exhibition by Rakesh Yadav Readers Publication the entry ticket was sold for Rs. 5. Later on it was decreased by 20%. As a result the collection amount from ticket selling increased by 44%. Find the percentage increase in the number of visitors:
 (a) 80% (b) 50%
 (c) 25% (d) 75%
238. In a rectangle 'a' represents breadth and 'b' length. If the breadth is decreased by 20% and the length is increased by 10% then what percentage the new area will be in comparison with the area 'ab' ?
 (a) 88% (b) 111%
 (c) 80% (d) 120%
239. A house costing Rs. 133100 was constructed on a piece of land costing Rs. 72900. In what time will the cost of both be same if the cost of land is increasing by 10% annually while the cost of house is decreasing 10% annually?
 (a) $1\frac{1}{2}$ years (b) 2 years
 (c) $2\frac{1}{2}$ years (d) 3 years
240. Rakesh Yadav spends $12\frac{1}{2}$ % of the money and then he spends Rs. 1600. After this he spends 20% of the remaining and now left with Rs. 960. Then find how much money he has initially?
 (a) Rs. 2720 (b) Rs. 3000
 (c) Rs. 3200 (d) Rs. 3600
241. Rakesh Yadav sold his scooter the price of which was Rs. 36000. He gave a discount of 8% on Rs. 20,000. and 5% discount on the next Rs. 10,000. If he wanted to give net discount of 7% how much discount he must have given on remaining Rs. 6,000?
 (a) 5% (b) 6%
 (c) 7% (d) 8%
242. Rakesh Yadav gets tax rebate upto, 10,00,00 rupees per year but above it he has to pay tax at the rate of 20%. If in a year he has paid 3160 rupees as tax then find his monthly income
 (a) Rs. 1,15,800
 (b) Rs. 1,03,160
 (c) Rs. 13,160
 (d) Rs. 9650
243. The price of a vegetable is increased by 30%, then by how much %, the person should reduce in its consumption so that his expenditure would increase by only 10% ?
 (a) $12\frac{5}{13}$ % (b) $15\frac{5}{13}$ %
 (c) $17\frac{3}{7}$ % (d) $15\frac{4}{7}$ %
244. A person spends 25% of his total income on clothes and 20% of the remaining on food. If he saves Rs. 3600 out of his total income, then find his total income and also his expenditure on clothes :
 (a) 6000, 2000 (b) 5000, 1250
 (c) 6000, 1500 (d) 8000, 2000
245. If Rakesh Yadav gives 30% of his total income to his elder daughter and 40% of the remaining to his younger daughter. Then he distributes the remaining money in his three sons equally. If each son gets Rs.672 then determine how much money did the elder daughter and younger daughter get?
 (a) 1540, 1244 (b) 1440, 1256
 (c) 1440, 1344 (d) 1530, 1344
246. Due to a decrease of 20% in the price of mangoes, a man is now able to buy 10 mangoes more for Rs.5. Find the current and initial number of the mangoes bought in 1 rupees:
 (a) 10, 8 (b) 10, 6
 (c) 8, 6 (d) 12, 10
247. In an exam, Bhuvnesh scores 25% of the total marks and failed by 60 marks. Another student Saurabh in the same exam scores 50% of total marks and thus gets 40 marks more than passing marks. Then by how much % the passing marks should be increased to get full marks in the exam ?
 (a) 150 % (b) 90 %
 (c) 120 % (d) 105 %



248. A labourer works 60 hrs. in a week and earns Rs.2400 as wages. If his per hour wages are increased by 40% and work

hours are reduced by $16\frac{2}{3}\%$, then find by how much % his weekly wages will be increased or decreased?

(a) $12\frac{1}{2}\%$ (b) $16\frac{2}{3}\%$

(c) $7\frac{9}{13}\%$ (d) $15\frac{2}{3}\%$

249. Four students A, B, C & D, sit in an exam. A gets 50% more marks than B, B gets $16\frac{2}{3}\%$ more than C, and C gets

$33\frac{1}{3}\%$ more than D. If A gets 350 marks, and the maximum marks of the exam are 600. Find percentage marks of D

(a) 20 % (b) 10 %

(c) 25 % (d) 50 %

250. 49 % of the soldiers of a cantonment speak Hindi and 36% speak English and 15% speak both Hindi and English. If 900 soldiers do not speak any of the languages, then find how many soldiers speak only English :

(a) 610 (b) 630

(c) 570 (d) 670

251. If twice the numerator of a fraction is increased by 20%, and thrice the denominator of the same fraction is decreased by 30%. Then the fraction

becomes 24% of $\frac{16}{21}$, find the fraction:

(a) $\frac{2}{25}$ (b) $\frac{1}{25}$

(c) $\frac{3}{25}$ (d) $\frac{4}{25}$

252. If population of a village is 2000, if population increases by 10% in 1st two years and by 5% in last 3 years, then determine the population of village after 5 years (approx):

(a) 2800 (b) 2700

(c) 2650 (d) 2930

253. The price of a ticket of a circus is 12. When the price of the ticket is reduced, then the no. of visitors increases by 80%, and hence total earnings of circus increases by 20%. Find the current price of a ticket ?

(a) Rs.6 (b) Rs.8

(c) Rs.12 (d) Rs.10

254. The population of a city is 120000. The population of males and females are increased by 12% and 9% respectively. If at the end of the year the population is 132750, then find the difference between the no. of males and females:

(a) 12000 (b) 15000

(c) 10000 (d) 8000

255. The total population of a village is 8400 out of which the ratio of males and females is 43 : 41. 80% of the males are literate and 40% of the females are illiterate. Find the literacy % of that village?

(a) $75\frac{5}{21}\%$ (b) $70\frac{5}{21}\%$

(c) $72\frac{5}{23}\%$ (d) None of these

256. In an election two candidates participate and 10% of the voters did not vote and out of total votes polled, 2000 votes declared invalid. The winner gets 52% of the total votes on voting list and wins by 13200 votes. Find the no. of votes polled in favour of losing candidate?

(a) 28400 (b) 32600

(c) 26200 (d) 30400

257. In a village, men, women and children are in ratio 9 : 8 : 3. 80% of males are literate and 30% of females are illiterate. If 90% of children are literate, then find the illiteracy % age of the village:

(a) $22\frac{1}{2}\%$ (b) $16\frac{2}{3}\%$

(c) $23\frac{1}{2}\%$ (d) $19\frac{2}{3}\%$

258. It is necessary to obtain 40% marks to pass an exam. A obtains 10% less marks than

pass marks. B obtains $11\frac{1}{9}\%$

less marks than A, and C

obtains $41\frac{3}{17}\%$ less marks

than A & B. Then find C qualified the exam or not?

(a) No (b) Yes

(c) can't be determined

(d) None of these

259. The ratio of the boys and girls sitting in an examination is 16 : 9. The ratio of boys and girls that passed the exam is 4 : 3. If 75% girls passed in the exam then find the % age of boys who pass the exam and also find the total percentage of students that passed in the exam?

(a) 56.25 %, 61%

(b) 56.25 %, 65%

(c) 56.25%, 67 %

(d) 56.25%, 63 %

260. In an examination, 5 questions were asked. 5% of total students answered all the questions and 5 % did not answered any of the questions. 25% of the remaining students answered only one question and 20% answered 4 questions.



- 24 $\frac{1}{2}$ % of total students answered 2 questions. If 200 students answered 3 questions, then find the total no. of students appeared in the examination?
- (a) 1000 (b) 1200
(c) 700 (d) 800
261. In an exam, a student is asked to divide 7.5 by 8.3 and finding the quotient upto 3 places of decimal, but by mistake he divide 8.3 by 7.5 and finds the quotient upto 2 places of decimal. Find the error % (approx)?
- (a) 21.8 % (b) 20.7 %
(c) 24.2 % (d) 22.3 %
262. If the wages of a labourer is increased by 12.5 % and the work hours of the labourer are decreased by 8%. Earlier he worked 50 hrs. a week and thus earns Rs. 1200 as wages. Find out his (i) new wages per week and (ii) % age increase in his weekly wages ?
- (a) Rs.1242, 4.5%
(b) Rs.1240, 3.5%
(c) Rs.1242, 3.5%
(d) Rs.1240, 4.5%
263. A survey carried out on N no. of people of an institution reveals that 60% people drinks tea, and when survey was carried out on the other extra P no. of people of same institution, then it was found that all the people drinks tea. Then it was also found that 70% of both types of people P and N drinks tea. Find out N is what % of P:
- (a) 200 % (b) 150 %
(c) 250 % (d) 300 %
264. Rakesh Yadav deposits some money in the bank. He invested 150% of it in stocks and 25% more than amount deposited in bank invested in bonds. At the end of a year, he made some income from the above investemnts which is 12.5% of the money deposited in bank, $6\frac{1}{4}$ % of amount invested in stocks and 5% of the amount invested in bonds. Out of the total income he made, he spent again 60% to buy the shares of a company. If he saves Rs.90000 from his total income, then find the amount of money he invested initially in stocks :
- (a) 140,0000 (b) 100,0000
(c) 160,0000 (d) 120,0000
265. The population of a village is 5500. If no. of males are increased by 15% & no. of females are increased by 12% then population becomes 6244. Find the difference between no. of males & females of that village :
- (a) 150 (b) 200
(c) 225 (d) 100
266. In a cinema hall, price of D.C. ticket category is Rs.20. When price of ticket is reduced, the no. of viewers increase by 40% and total earning increases by 20%. Find by how much the price of ticket reduced ?
- (a) Rs. $1\frac{6}{7}$ (b) Rs. $2\frac{6}{7}$
(c) Rs. $3\frac{6}{7}$ (d) Rs. $4\frac{6}{7}$
267. A student got 33% marks in an exam and failed by 72 marks, but in same exam, another student got 49% marks and he passed by 56 marks. Find the maximum marks, passing marks, percentage of passing marks in the exam :
- (a) 800, 336, 36 %
(b) 800, 336, 38 %
(c) 800, 336, 42 %
(d) 800, 336, 40 %
268. The radius of a shpere is 20 cm. Find out, its surface area is how much % of its volume ?
- (a) 15 % (b) 18 %
(c) 20 % (d) 19 %
269. A no. N is divided into three parts such that the sum of Ist two parts is K% of third part. Find the third part :
- (a) $\frac{100N}{K+100}$ (b) $\frac{100K}{N+50}$
(c) $\frac{100N}{100K+1}$ (d) $\frac{50N}{100+K}$
270. The population of a city was 180000. It was increased by 10% in first 2 years, 20 % in next 3 years and due to some reason it is reduced by 2% in last year. Find the population after 6 years :
- (a) 368830 (b) 388830
(c) 568830 (d) 408830
271. In an exam, the maximum marks of three subjects Geography, History and Sanskrit were 120, 140 and 100 respectively. A student scored in these subjects 40%, 55% and 45% respectively. If maximum marks of Maths are 180 then how much percentage marks he should score in Maths so that his total % age in all four subjects is to 60%?
- (a) 30% (b) $75\frac{5}{17}$ %
(c) $85\frac{5}{9}$ % (d) $80\frac{5}{9}$ %
272. A's salary is 20% less than B. B's salary is 25% less than C, and C's salary is 20% more than D. If 15% of D's income is Rs.45000, then find the difference between the income of A and B ?
- (a) 62000 (b) 58000
(c) 54000 (d) 65000



273. In a village there are 700 males, 500 females and 800 children. If due to epidemic 20% males, 40% females and 10% children are died, find the % age of safe population of the village:
 (a) 49 % (b) 53 %
 (c) 48 % (d) 79 %

274. The price of a table and chair is Rs.200 and Rs. 140 respectively. If the price of table and chair is increased by 20 % and 30 % respectively. Find the net value/price of two dozen tables and 25 chairs:
 (a) 10700 (b) 10310
 (c) 1200 (d) 12400

275. Four amounts of money are such that 'a' is 20% of b, and b is 20% more than c, and c is $\frac{1}{3}$ times more than d, then

find 20% of $\frac{2a}{b+c}$?

(a) $\frac{16}{275}$ (b) $\frac{12}{275}$

(c) $\frac{18}{390}$ (d) $\frac{15}{288}$

276. The income of a person is increased by Rs.4800 and simulataneously, the rate of interest paid by him is decreased from 12% to 10%. But now the amount of interest paid by him is same as in previous situation. If in both situations 20 % income is tax free, then find his increased income ?

(a) Rs. 24,000 (b) Rs. 28,000
 (c) Rs. 23,200 (d) Rs. 28,800

277. Due to an increase of 32% in the price of pulses a person reduces its consumptions in such a way that, his expenditure would only

increase by 10%. If after price rise he consumes 150kg pulses. Find its intial consumptions :

(a) 200 kg (b) 150 kg
 (c) 180 kg (d) 210 kg

278. A factory made 3 types of toys and the ratio of quantity of toys is 5 : 4 : 2. 10% of each type of toys produced are destroyed in process. Out of remaining toys 40%, 30% and 20% are exported. Find the domestic consumption of toys is what % of total toys produced?

(a) $16\frac{2}{3}\%$ (b) $60\frac{6}{11}\%$

(c) $12\frac{1}{2}\%$ (d) $37\frac{1}{2}\%$

279. When P litres of oil is poured into a vessel then K% vessel remains empty. How much more oil must be poured into the vessel so that the vessel will be filled completely and also find the capacity of the vessel:

(a) $\frac{PK}{100-K}, \frac{100P}{100-k}$

(b) $\frac{PK}{100-P}, \frac{100K}{100-k}$

(c) $\frac{10PK}{100-K}, \frac{PK}{10P-k}$

(d) $\frac{10PK}{100-P}, \frac{100K}{100-k}$

280. A total of 12000 students sit in an examination. $\frac{2}{5}$ of total students were girls. 60% of the boys failed in exam and 55% of girls passed in exam. 80% of the total passed students passed in first division. The no. of students passed in Ist division is what % of total students that took the exam?

(a) 36.8 % (b) 38.4 %

(c) 32.2 % (d) 40.2 %

281. The total population of a city is 150000, in which 78000 are males, and rest are females. Out of every 1000 males, 700

are literate and 22% of total population is illiterate. Find out % age of literate women :

(a) $83\frac{1}{3}\%$ (b) $83\frac{2}{3}\%$

(c) $86\frac{2}{3}\%$ (d) $80\frac{2}{3}\%$

282. In an election 10% voters did not participate in an election and 1200 votes are found invalid. The winner gets 68% of total voting list and he won by 56400 votes. Find the votes polled in favour of former (losing) candidate ?

(a) 24200 (b) 24800

(c) 25200 (d) 26500

283. A labourer earn Rs.4800 in 60 days in a mill later on his wages are increased by 10% and his work days are reduced by 15%. Find how much money more or less as compared to intial situation, the labourer will get now :

(a) Rs. 312 less

(b) Rs. 312 more

(c) Rs.326 more

(d) Rs. 326 less

284. A cricket team played 40 matches a certain year and won 40% of them. Next year, the team won some number of matches continuously, and thus its winning percentage increased to 80%. how many matches the team won continuously :

(a) 120 (b) 80

(c) 100 (d) 75

285. A salesman is hired on the condition a job saying that he will be given 6% commission on the sales done by him. But later on it was decided that he will be given a monthly salary of Rs.1200 and every month, 3% commission will be awarded on sales above Rs.5000. If in second case his earnings are Rs.1350 less than earlier, then find his sales per month :

(a) Rs.80000 (b) Rs.100000

(c) Rs.60000 (d) Rs. 90000



286. Two students appeared at an examination. One of them secured 9 marks more than the other and his marks were 56 % of the sum of their marks. The marks obtained by them are:
 (a) 42,33 (b) 43,34
 (c) 41,32 (d) 39,30
287. Multiplying a certain no. by 30 is 80% of some other no. multiplied by 6. Find the second no. is what % of the first no.?
 (a) 625 % (b) 125 %
 (c) 675 % (d) 575 %
288. In a competitive examination, there are 50000 applicants. Out of which 10% are absent in examination. 40% of present candidates are selected and 30% out of selected candidates are declared successful in interview. Find the selected candidates in interview are what % of total no. of applicants:
 (a) 10.2 % (b) 10.8 %
 (c) 11.2 % (d) 10.6 %
289. The labour of a labourer is increased by 20%. But every week his work time is reduced by 20%. If earlier he earns Rs.4000 per week, then how much money he will earn per month (4 weeks) according to his new labour price ?
 (a) 16320 (b) 15960
 (c) 15360 (d) 14420
290. The monthly salary of Ramesh is Rs.5000 and he spends on clothes and food in ratio 2 : 5. If price of clothes increased by 10% and expenditure on food is increased by 20%. Then by how much % his monthly income should be increased, so that his consumption will remain unchange:
 (a) $17\frac{1}{7}\%$ (b) $18\frac{1}{7}\%$
 (c) $14\frac{2}{7}\%$ (d) $21\frac{1}{7}\%$
291. The ratio of expenditure and savings of Rakesh Yadav is 8 : 5. 20% of the expenditure is on food and 40% is made on clothes. 60% of the savings he deposited in bank. Find the amount spent on clothes is what % of his bank deposited?
 (a) $104\frac{2}{3}\%$ (b) $103\frac{2}{3}\%$
 (c) $106\frac{2}{3}\%$ (d) $101\frac{2}{3}\%$
292. When a number is increased to 125% then number becomes 300 less than the other number but if that no. is increased to 150 % than that number becomes 200 less than that second number. Find the sum of both the numbers:
 (a) 1000 (b) 1200
 (c) 800 (d) 1600
293. The income of four persons are in the ratio of 7 : 4 : 8 : 10. First person spends 20% of his income second person saves 30%, 3rd person saves 40% and fourth person spends 10%. If the difference of total income of four persons and total expenditure of 4 persons is Rs. 5700, what is the total income of all four persons :
 (a) 8700 (b) 8500
 (c) 8300 (d) 8900
294. Four vessels are placed on table in such a way that when we move by measuring from left to right, their capacity keeps on becoming thrice. Now 25% of first vessel, 30% of second vessel, 40% of third vessel and 20% of fourth vessel is empty. If the liquid of all the four vessels is taken out and mixed in a fifth vessels. Then find out the volume of the liquid in fifth vessel is what % of the original capacity of the four vessels :
 (a) $74\frac{5}{8}\%$ (b) $75\frac{5}{9}\%$
 (c) $72\frac{3}{7}\%$ (d) $76\frac{7}{9}\%$
295. In an exam the total sum of maximum marks of all subjects is 2500. In that exam, Mohan scores 50% more than Sohan, Sohan scores $16\frac{2}{3}\%$ less than Rajiv and Rajiv scores $33\frac{1}{3}\%$ more than Madan. Mohan scores a total of 1500 marks in all subjects. Find the score of Madan :
 (a) 1100 (b) 1200
 (c) 750 (d) 900
296. In a school 75% students passed in section A and 82% students passed in section B and 15% failed in both sections. If total no. of passed candidates is 1620, then find total no. of students and also find failed students in section A.
 (a) 2250, 225 (b) 2170, 225
 (c) 2275, 225 (d) 2200, 225
297. In a village $\frac{2}{3}$ rd are males and rest are females. 80% of males and 70% of females are literate. 40% of literate males and 30% of literate females are graduates. 20% of graduate males and 25% of graduate females are in a government job. Find the no. of males and females are in government service is what % of total population of the village :
 (a) 5.8 % (b) 6.01 %
 (c) 5.09 % (d) 6.20 %
298. In a school 40% of the students play football and 50% play cricket. If 18% of the students neither play football nor cricket, the percentage of the students playing both football and cricket is :
 (a) 40 % (b) 32 %
 (c) 22 % (d) 8 %
299. In a class, the number of girls is 20% more than that of the boys. The strength of the class is 66. If 4 more girls are admitted to the class, then ratio of the number of boys to that of the girls is :
 (a) 1 : 2 (b) 3 : 4
 (c) 1 : 4 (d) 3 : 5



300. If the numerator of a fraction is increased by 20 % and the denominator is decreased by 5%, the value of the new fraction becomes $\frac{5}{2}$. The original fraction is :
- (a) $\frac{24}{19}$ (b) $\frac{3}{18}$
(c) $\frac{95}{48}$ (d) $\frac{48}{95}$
301. A number is first decreased by 10% and then increased by 10 %. The number so obtained is 50 less than the original number is :
- (a) 5900 (b) 5000
(c) 5500 (d) 5050
302. In an examination, 60 % of the candidates passed in English and 70% of the candidates passed in Mathematics, but 20 % failed in both the subjects, if 2500 students passed in both then the number of candidates that appeared at the examination was:
- (a) 3000 (b) 3500
(c) 4000 (d) 5000
303. In a village, each of the 60 % of families has a buffalo and each of the 30 % of families has a cow and each of the 15% of families has both a cow and buffalo. In all there are 96 families in the village. How many families do not have a cow or a buffalo ?
- (a) 20 (b) 24
(c) 26 (d) 28
304. 72 % of the students of a certain class took Biology and 44% took Mathematics. If each student took at least one subject from Biology or Mathematics and 40 took both, then the total number of students in the class is:
- (a) 200 (b) 240
(c) 250 (d) 320
305. The price of an article is reduced by 25 % but the daily sale of the article is increased by 30%. The net effect on the daily sale receipts is :
- (a) $2\frac{1}{2}\%$ increase
(b) $2\frac{1}{2}\%$ decrease
(c) 2 % increase
(d) 2 % decrease
306. Shelf A has $\frac{4}{5}$ of the number of books that shelf B has. If 25 % of the books in A are transferred to B and then 25 % of the books from B are transferred to A, then the percentage of the total number of books that A will have is :
- (a) 25 (b) 50
(c) 75 (d) 100
307. In an examination on which full marks were 500. A got 10 % less than B. B got 25 % more than C. C got 20 % less than D. If A got 360 marks, what percentage of full marks was obtained by D ?
- (a) 90 % (b) 80 %
(c) 50 % (d) 60 %
308. An ore contains 25 % of an alloy that has 90 % iron. Other than this, in the remaining 75 % of the ore, there is no iron. To obtain 60 kg of pure iron, the quantity of the ore needed, in kgs, is approximately :
- (a) 250.57 (b) 266.67
(c) 275.23 (d) 300
309. Tickets for all but 100 seats in a 10,000 seat stadium were sold. Of the tickets sold, 20 % were sold at half price and the remaining tickets were sold at the full price of Rs. 20. The total revenue from the ticket sales, in Rs. was :
- (a) 158400 (b) 178200
(c) 180000 (d) 198000
310. A man had a certain amount with him. He spent 20 % of that to buy an article and 5 % of the remaining on transport. Then he gifted Rs. 120. If he is left with Rs. 1,400, the amount he spent on transport is:
- (a) Rs. 76 (b) Rs. 61
(c) Rs. 65 (d) Rs. 80
311. In an examination, 52 % of the candidates failed in English and 42 % failed in Mathematics. If 17 % percent failed in both the subjects, then the percentage of candidates, who passed in both the subjects, was:
- (a) 23 (b) 21
(c) 25 (d) 22
312. In an assembly election, a candidate got 55 % of the total valid votes. 2 % of the total votes were declared invalid. If the total number of voters is 104000, then the number of valid votes polled in favour of the candidate is :
- (a) 56506 (b) 56650
(c) 56560 (d) 56056
313. When income of a man increased by Rs. 6000, tax rate 18 % reduced to 15 % while in both situations 25 % income is tax free. Find his income initially, when he paid tax equally in both the situations?
- (a) Rs. 30,000 (b) Rs. 40,000
(c) Rs. 25,000 (d) Rs. 35,000
314. A computer software company appointed a salesman and gives 7 % commission to him on sale of the computers. If



company gives Rs. 3,000 per month to the salesman and allows 4 % commission on the sale of more than Rs. 10,000. In the second condition, the salesman gets Rs. 800 more. Find the total sale ?

- (a) Rs. 50,000 (b) Rs. 70,000
(c) Rs. 60,000 (d) Rs. 65,000

315. In a two digit positive number, the digit in the unit place is equal to the square of the digit in ten's place, and the difference between the number and the number obtained by interchanging the digits is 54. What is 40 % of the original number?

- (a) 39 (b) 24
(c) 37.2 (d) 15.6

316. 500 kg of ore contained a certain amount of iron. After the blast furnace process, 200 kg of slag containing 12.5 % of iron was removed. The percentage of iron in the remaining ore was found to be 20 % more than the percentage in the original ore. How many kg of iron were there in the original 500 kg ore ?

- (a) $212\frac{1}{2}$ (b) 89.28
(c) 85 (d) 145

317. In a city, 35 % of the population is composed of migrants, 20 % of whom are from rural areas. Of the local population, 48 % is female while this figure for rural and urban migrants is 30 % and 40 % respectively. If the total population of the city is 7,28,400 what is its female population?

- (a) 5,09,940 (b) 3,49,680
(c) 3,24,138 (d) none of these

318. Ajay and Vikas are sharing a flat, with an arrangement of equally dividing the household expenses. Ajay went to Pune, where a sale was going on and bought batteries for the house, worth Rs. 150 on 20 % discount. But he lost them on his way back and had to pay new ones, after he reached Delhi. How much did he end up spending on the batteries ?

- (a) Rs. 280 (b) Rs. 195
(c) Rs. 270 (d) Rs. 75

319. At IIM Bangalore, 60 % of the students are boys and the rest are girls. Further 15 % of the boys and 7.5 % of the girls are getting a fee waiver. If the number of those getting a fee waiver is 90, find the total number of students getting 50% concession if it is given that 50% of those not getting a fee waiver are eligible to get half fee concession ?

- (a) 360 (b) 280
(c) 320 (d) 330

320. A and B have, between them, Rs. 1200. A spends 12% of his money while B spends 20 % of his money. They are then left with a sum that constitutes 85 % of the whole sum. Find what amount is left with A :

- (a) Rs. 750 (b) Rs. 800
(c) Rs. 700 (d) Rs. 660

321. The salary of a person is increased by Rs. 4800 and the rate of tax is decreased by 2% from 12% to 10%. The effect is such that he is now paying the same tax as before. If in both the cases, the standard tax deduction is fixed at 20% of the total income, find the increased salary ?

- (a) Rs. 32,800 (b) Rs. 36,800
(c) Rs. 28,000 (d) None of these

322. Australia scored a total of x runs in 50 overs. India tied the scores in 20 % less overs . If India's average run rate had been 33.33 % higher the scores would have been tied 10 overs earlier. Find how many runs were scored by Australia :

- (a) 250 (b) 240
(c) 200
(d) Can not be determined

323. The raw material and manufacturing cost formed individually 70 % and 30 % of the total cost and the profit percentage is 10 % of the raw material. If the cost of raw material increase by 20 % and the cost of manufacturing is increased by 40 % and the selling price is increased by 80 % then the new profit % is :

- (a) 57 % (b) 65.8 %
(c) 60 %
(d) can't be determined

324. In a group of N people 60 % of them prefer tea. All the people of group P prefer tea. Then it is also found that 70 % of both group prefer tea. Find what N of P :

- (a) 250 % (b) 200 %
(c) 300 % (d) 350 %

325. 75 % students of section A got passed and 82 % students of section B got passed. 15 % from both the sections got failed. If the total no. of students who got passed is 1620. Find the total no. of students and no. of students who got failed only in section A:

- (a) 1880, 188 (b) 2260, 226
(c) 2200, 400 (d) 2250, 225

326. The pressure of a definite mass of a gas is directly proportional to the temperature and inversely proportional to the volume under the given conditions. If temperature is increased by 40 % and the volume is decreased by 20% then the new pressure will:

- (a) be increased by 75 %
(b) reduce to 25%
(c) be increase by 20%
(d) increase by 28%

ANSWER KEY

1. (a)	34. (d)	67. (b)	100.(c)	133.(d)	166.(a)	199.(c)	232.(d)	265.(d)	296.(a)
2. (d)	35. (c)	68. (d)	101.(b)	134.(b)	167.(c)	200.(c)	233.(b)	266.(b)	297.(b)
3. (d)	36. (a)	69. (c)	102.(d)	135.(c)	168.(c)	201.(b)	234.(b)	267.(c)	298.(d)
4. (a)	37. (a)	70. (c)	103.(c)	136.(a)	169.(c)	202.(b)	235.(a)	268.(a)	299.(b)
5. (a)	38. (b)	71. (d)	104.(c)	137.(c)	170.(d)	203.(c)	236.(b)	269.(a)	300.(c)
6. (a)	39. (d)	72. (b)	105.(b)	138.(a)	171.(b)	204.(d)	237.(a)	270.(a)	301.(b)
7. (a)	40. (b)	73. (b)	106.(b)	139.(d)	172.(c)	205.(b)	238.(a)	271.(c)	302.(b)
8. (a)	41. (c)	74. (a)	107.(b)	140.(d)	173.(d)	206.(b)	239.(d)	272.(c)	303.(b)
9. (a)	42. (a)	75. (c)	108.(c)	141.(d)	174.(b)	207.(a)	240.(c)	273.(d)	304.(c)
10. (c)	43. (c)	76. (d)	109.(d)	142.(d)	175.(a)	208.(c)	241.(c)	274.(b)	305.(b)
11. (a)	44. (b)	77. (d)	110.(c)	143.(c)	176.(b)	209.(c)	242.(d)	275.(b)	306.(b)
12. (b)	45. (a)	78. (a)	111.(b)	144.(b)	177.(c)	210.(b)	243.(b)	276.(d)	307.(b)
13. (c)	46. (d)	79. (c)	112.(d)	145.(b)	178.(a)	211.(d)	244.(c)	277.(c)	308.(b)
14. (d)	47. (c)	80. (d)	113.(b)	146.(b)	179.(b)	212.(a)	245.(c)	278.(b)	309.(b)
15. (b)	48. (b)	81. (c)	114.(c)	147.(d)	180.(c)	213.(c)	246.(a)	279.(a)	310.(b)
16. (a)	49. (d)	82. (b)	115.(a)	148.(a)	181.(c)	214.(a)	247.(a)	280.(a)	311.(a)
17. (c)	50. (b)	83. (c)	116.(a)	149.(d)	182.(c)	215.(d)	248.(b)	281.(c)	312.(d)
18. (a)	51. (c)	84. (d)	117.(c)	150.(b)	183.(b)	216.(d)	249.(c)	282.(c)	313.(a)
19. (d)	52. (c)	85. (a)	118.(d)	151.(c)	184.(d)	217.(b)	250.(b)	283.(a)	314.(c)
20. (b)	53. (c)	86. (b)	119.(b)	152.(a)	185.(b)	218.(b)	251.(d)	284.(b)	315.(d)
21. (d)	54. (d)	87. (b)	120.(c)	153.(a)	186.(a)	219.(b)	252.(a)	285.(a)	316.(b)
22. (a)	55. (a)	88. (c)	121.(b)	154.(a)	187.(c)	220.(c)	253.(b)	286.(a)	317.(c)
23. (d)	56. (b)	89. (d)	122.(a)	155.(c)	188.(a)	221.(c)	254.(c)	287.(a)	318.(b)
24. (d)	57. (c)	90. (a)	123.(b)	156.(c)	189.(b)	222.(b)	255.(b)	288.(b)	319.(d)
25. (b)	58. (d)	91. (c)	124.(b)	157.(c)	190.(b)	223.(b)	256.(a)	289.(c)	320.(d)
26. (b)	59. (b)	92. (b)	125.(a)	158.(b)	191.(c)	224.(b)	257.(a)	290.(a)	321.(d)
27. (d)	60. (a)	93. (c)	126.(c)	159.(c)	192.(d)	225.(b)	258.(b)	291.(c)	322.(d)
28. (b)	61. (c)	94. (d)	127.(b)	160.(c)	193.(d)	226.(d)	259.(d)	292.(b)	323.(a)
29. (b)	62. (a)	95. (d)	128.(c)	161.(b)	194.(c)	227.(b)	260.(d)	293.(a)	324.(c)
30. (c)	63. (c)	96. (b)	129.(c)	162.(c)	195.(a)	228.(d)	261.(a)	294.(a)	325.(d)
31. (a)	64. (c)	97. (a)	130.(a)	163.(d)	196.(c)	229.(a)	262.(c)	295.(d)	326.(a)
32. (a)	65. (c)	98. (b)	131.(d)	164.(d)	197.(a)	230.(a)	263.(d)		
33. (a)	66. (a)	99. (d)	132.(d)	165.(a)	198.(a)	231.(c)	264.(d)		

Maths By

Solution

1. (a) % Marks score by the student A

$$= \frac{20}{30} \times 100 = 66\frac{2}{3}\%$$

% Marks score by the student B

$$= \frac{40}{70} \times 100 = 57\frac{1}{7}\%$$

Now it is clear that the performance of A is better.

Alternatively → (a)

	Marks Score	Out of
A →	20 _{×7}	30 ₇
B →	40 _{×3}	70 ₃

(210)

Note:- Equal the out of marks then we can directly analyse the performance.

	Marks Score	Out of
A →	140	210
B →	120	210

Now we can say performance of A is better.

2. (d) Apparently, the answer to the question seems to be company B. The question can not be answered since we don't know the previous year's sales figure.
3. (d) Percentage change based on the final value

$$= \frac{2}{20} \times 100 = \frac{100}{10}\% = 10\%$$

4. (a) Let the price of B = Rs. 100
-
- Now According to the question :-

A	:	B	:	C
70	:	100	:	$\frac{700}{13}$

Note:- Make the ratios in such a way that can not generate fractions:

∴ Multiply 13 in all ratios.

A	:	B	:	C
910	:	1300	:	700

The percentage by which C's price is cheaper than

$$\text{B's price} = \frac{(1300 - 700)}{1300} \times 100$$

$$= \frac{600}{13} = 46.15\%$$

5. (a) Let

$$\text{Length} \times \text{Width} = \text{Area}$$

$$\text{Old } 10 \quad 10 = 100$$

$$\begin{array}{ccc} +20\% & -10\% & \\ \text{New } 12 & 9 & = 108 \end{array}$$

$$\text{Increased in Area} = 108 - 100 = 8$$

$$\% \text{ increased} = \frac{8}{100} \times 100 = 8\% \text{ Ans.}$$

Alternatively →**Note:-** In such type of questions we can use the below given formula.

$$\left[X + Y + \frac{XY}{100} \right] \quad \left[\begin{array}{l} + \text{ Shows increase} \\ - \text{ Shows decrease} \end{array} \right]$$

$$\text{Change in area} = 20 - 10 - \frac{20 \times 10}{100} = 8\%$$

Sign is +ve so increase in area = 8%

6. (a) According to the question :-

Rise in the price = 25%

$$\% \text{ Reduction in consumption} = \frac{25}{125} \times 100 = 20\%$$

But actual reduction in consumption = 20kg

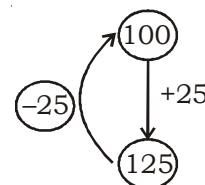
$$\therefore 20\% = 20 \text{ kg}$$

$$1\% = \frac{20}{20} \text{ kg}$$

$$\begin{aligned} \text{original consumption (100\%)} &= \frac{20}{20} \times 100 \\ &= \underline{100 \text{ kg}} \end{aligned}$$

Money spent = 400 Rs (Given)

$$\text{Original price} = \frac{400}{100} = \underline{\text{Rs 4/kg}}$$

Alternatively:- Let the expenditure = 100 Rs

$$\Rightarrow \frac{25}{125} = \frac{1}{5} = \frac{4 \rightarrow \text{New}}{5 \rightarrow \text{Original}}$$

$$1 \text{ unit} \rightarrow 20 \text{ kg}$$

Original consumption = $20 \times 5 = 100$ kgNew consumption = $4 \times 20 = 80$ kgOriginal price of the rice = $\frac{400}{100} = \text{Rs } 4/\text{kg}$

7. (a) **Note :-** In such type of question try to make ratio between all the given variables.

$$\text{Ratio of Salary} \rightarrow \begin{array}{c|c} A : B & B : C \\ \hline 4 : 5 & 17 : 20 \end{array} \left[\begin{array}{l} -20\% = \frac{1}{5} \\ 15\% = \frac{3}{20} \end{array} \right]$$

Combine the ratio of salary :-

$$\begin{array}{c} A : B \Rightarrow 4 : 5 \\ B : C \Rightarrow 17 : 20 \\ \hline A : B : C \\ \text{Ratio} \rightarrow 68 : 85 : 100 \end{array}$$

C's salary more than A = $\frac{(100 - 68)}{68} \times 100$

$$= \frac{32}{68} \times 100 = \frac{8}{17} \times 100 = \frac{800}{17} = 47 \frac{1}{17} \%$$

8. (a) **Note :-** In such type of questions assume any value but ratio should not be changed.

$$\begin{array}{ccccccc} A & : & B & : & C & : & D \\ \text{Old cost} \rightarrow & 300 & : & 400 & : & 500 & : & 600 \\ & \downarrow +10\% & & \downarrow -20\% & & \downarrow -30\% & & \downarrow +40\% \end{array}$$

New cost $\rightarrow 330 \quad 320 \quad 350 \quad 840$ Total old cost = $(300 + 400 + 500 + 600) = 1800$ Rs.Total New cost = $(330 + 320 + 350 + 840) = 1840$ Rs.

$$\% \text{ Change} = \frac{(1840 - 1800)}{1800} \times 100 = \frac{40}{18} = 2 \frac{2}{9} \%$$

9. (c) Let the inheritance value Recieved by Rakesh Yadav = x

According to the question:-

$$\left[x \times \frac{(100 - 32.5)}{100} - 100000 \right] \times \frac{80}{100}$$

$$= (750000 + 250000)$$

$$\left[x \times \frac{67.5}{100} - 100000 \right] \times \frac{80}{100} = 1000000$$

$$x = 2000000, \quad x = \underline{20 \text{ Lakh}}$$

Alternatively-

Note:- These type of problems should either be solved through the reverse process or through options.

Option (c):- Total value of inheritance = 20 lakh
According to the question:-

$$20 \text{ lakh} \xrightarrow{-32.5\%} 13.5 \text{ Lakh} \xrightarrow{-1 \text{ Lakh}} 12.5 \text{ Lakh} \\ \boxed{2.5 \text{ Lakh}} \xleftarrow{-7.5 \text{ Lakh}} 10 \text{ Lakh} \xleftarrow{-20\%}$$

Same as mention in question.

So option (c) is correct.

$$10. (a) \text{ Value} = 70 \times \frac{1}{5} \times \frac{1}{2} \times \frac{3}{4} = \frac{21}{4} = \underline{5.25}$$

$$11. (b) 41 \frac{3}{17} \% = \left(\frac{697 + 3}{17} \right) \frac{1}{100} = \frac{700}{17 \times 100} \\ = \left[\frac{7}{17} \right]$$

12. (b) **Note** $\rightarrow$ (1) If the price of a commodity increases by r %, then the reduction in consumption so as not to increase the expenditure is

$$= \left[\frac{r}{(100 + r)} \times 100 \right] \%$$

(2) If the price of a commodity decreases by r % then increase in consumption, so as not to decrease expenditure on this item is

$$= \left[\frac{r}{(100 - r)} \times 100 \right] \%$$

Use above these two methods to save your valuable time.

$$\% \text{ Reduction in consumption} = \frac{40}{(100 + 40)}$$

$$= \frac{40}{140} \times 100 = \frac{400}{14} = \frac{200}{7} = \underline{28.57\%}$$

13. (c) Let the expenditure = 100 Rs.

After increase of 40% = 140 Rs.

According to the question,

Increase in expenditure should be only 5% = 105

$$\% \text{ Reduction} = \frac{(140 - 105)}{140} \times 100$$

$$\% \text{ Reduction} = \frac{35}{140} \times 100 = 25\%$$

14. (d) $\therefore \left[25\% = \frac{1}{4} \right]$ $\begin{array}{c|c} \text{Ram : Shayam} & \text{Ram : Bram} \\ 3 : 4 & 5 : 4 \end{array}$

Note :- The price of Ram's goods should be equal in both cases. So equal the prices.

Ram : Shayam : Bram
15 : 20 : 12

% Bram's goods cheaper than Shayam's

$$= \frac{(20 - 12)}{20} \times 100 = 40\%$$

15. (b) Let the total number of valid votes get by Bhuvnesh = x

According to the question:-

$$x = 6000 \times \frac{75}{100} \times \frac{100 - 65}{100} = 6000 \times \frac{75}{100} \times \frac{35}{100}$$

$$x = 1575$$

16. (a) **Note :-** We can assume any value as the height of the candidate to save your valuable time.

Let height = $4x$ feet

$$\text{After increment} = 4x \times \frac{125}{100} = 5x \text{ feet}$$

% reduction in height to get original value

$$= \frac{(5x - 4x)}{5x} \times 100 = 20\%$$

17. (c) Actual length of Arjit's coat = $\frac{120}{115} \times 100$
= 104.34 cm

18. (a) Let the number = 5
According to the question:-

Case (I):- On dividing

$$\text{New number } (N_1) = \frac{5}{5} = 1$$

Case (II):- On multiplication

$$\text{New number } (N_2) = 5 \times 5 = 25$$

$$\% \text{ change in result} = \frac{(25 - 1)}{25} \times 100 = 96\%$$

19. (d) Let original price = 100
 $\therefore$ First new price = 120
& Final price = 80 % of 120 = 96
 $\therefore$ Final price is 4 % less than the original price.

20. (b) $\frac{1}{2} \times \frac{a}{100} \times b = \frac{3}{4} \times \frac{b}{100} \times c$

$$\frac{a}{2} = \frac{3}{4}c \Rightarrow a = \frac{3}{2}c$$

$$c = \frac{2}{3}a = 0.667a$$

21. (d)

	Old	New
Length $\rightarrow$	10	11
Breadth $\rightarrow$	5	6
Height $\rightarrow$	2	3
Volume $\rightarrow$	100	198

+98

$$\% \text{ Change in volume} = \frac{98}{100} \times 100 = 98\%$$

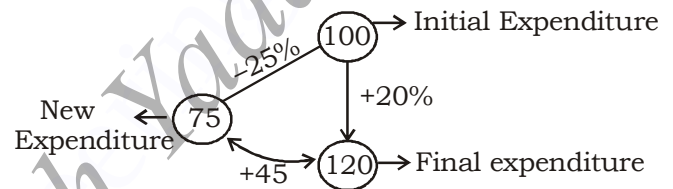
Alternatively :-

Let initial volume = 100

$$\text{New volume} = 100 \times \frac{110}{100} \times \frac{120}{100} \times \frac{150}{100}$$

$$\% \text{ change} = 98\%$$

22. (a) Let the initial expenditure = 100



$$\% \text{ change in consumption} = \frac{(120 - 75)}{75} \times 100$$

$$= \frac{45}{75} \times 100 = 60\%$$

23. (d) According to the question :-

$$60\% A + B = 175\% B$$

$$\frac{3}{5} A + B = \frac{7}{4} B$$

$$\frac{3}{5} A = \frac{3B}{4}$$

$$\frac{A}{5} = \frac{B}{4}$$

$$A : B = 5 : 4$$

Apparently it seems that A is bigger, but if you consider A and B to be negative the opposite would be true.

Hence option (d) is correct.

24. (d) Let the total number of votes = x

According to the question :-

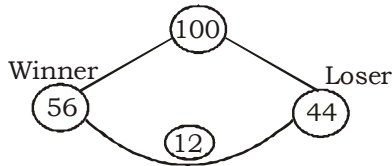
$$x \times \frac{80}{100} \times \frac{12}{100} = 144$$

$$x = \frac{144 \times 100 \times 100}{80 \times 12} = 1500$$

$$\text{Total votes} = 1500$$

Alternatively :-

(d) Let the cast votes = 100



$$12 \text{ units} = 144$$

$$1 \text{ unit} = 12$$

$$\text{Total cast votes} = 12 \times 100 = 1200$$

According to the question :-

$$\text{Total number of votes} = \frac{1200}{80} \times 100 = 1500$$

$$25. (b) 10\% = \frac{1}{10}$$

	Old population	New population
I st year	10	11
II nd Year	$\frac{10}{100}$	$\frac{11}{121}$

According to the question:-

$$100 \text{ units} = 100,000$$

$$1 \text{ unit} = 1000$$

$$121 \text{ units} = 121 \times 1000 = 121,000$$

Alternatively:-(b) Let the population at the start of the third year = x

$$x = 100,000 \times \frac{110}{100} \times \frac{110}{100}$$

$$x = 121,000$$

26. (b) The population of Mukherjee Nagar = 10,000

$$\begin{aligned} \text{New population} &= 10,000 \times \frac{110}{100} \times \frac{95}{100} \times \frac{120}{100} \\ &= 12,540 \end{aligned}$$

Alternatively :- (b)

		Old	New
(+10%)	Ist year	10	11
(-5%)	II nd year	20	19
(20%)	III rd year	$\frac{5}{1000}$	$\frac{6}{1254}$

According to the question :-

$$1000 \text{ units} = 10000$$

$$1 \text{ unit} = 10$$

$$\text{Total New population} = 1254 \times 10 = 12540$$

27. (d) Ratio of shares = $2x : 3x : 5x$

According to the question,

$$(2x + 3x + 5x) = 10,000$$

$$10x = 10,000$$

$$x = 1000$$

$$\text{Ist share} = 2 \times 1000 = 2000 \text{ Rs.}$$

$$\text{IInd share} = 3 \times 1000 = 3000 \text{ Rs.}$$

$$\text{IIIrd share} = 5 \times 1000 = 5000 \text{ Rs.}$$

Divident income

$$= \frac{2000 \times 10}{100} + \frac{3000 \times 25}{100} + \frac{5000 \times 20}{100}$$

$$= 200 + 750 + 1000 = 1950$$

$$28. (b) 20\% = \frac{1}{5}, \quad 10\% = \frac{1}{10}$$

According to the question :-

Rakesh Yadav : Bhuvnesh | Rakesh Yadav : Pawan
 Marks $\rightarrow$ 6 : 5 | 9 : 10

Marks of Rakesh Yadav will be equal in both cases.

Rakesh Yadav : Bhuvnesh : Pawan

Ratio of marks:- 18 : 15 : 20

$$\downarrow \times 72$$

$$1080$$

$$\text{Marks obtained by Pawan} = 20 \times 72 = \underline{1440}$$

$$\% \text{ marks} = \frac{1440}{2000} \times 100 = 72\%$$

29. (b) Passing marks = 33 [Given]

Let the total number of Students = 100

According to the question:-

$$\text{avg.} = \frac{30 \times (33 - 20) + 10 \times 33 + 35 \times 60}{100}$$

$$\text{avg.} = \frac{30 \times 13 + 330 + 2100}{75}$$

$$= \frac{390 + 330 + 2100}{75} = 37.6$$

30. (c) Let the monthly income of Rakesh Yadav = Rs x .

According to the question :-

$$x \times \frac{80}{100} \times \frac{85}{100} \times \frac{70}{100} = 9520$$

$$x = 20,000$$

Monthly income of Rakesh Yadav = Rs. 20,000

31. (a) The only logic for this question is that Rakesh Yadav's salary would be more than Bhuvnesh' salary. Thus, only option (a) is possible for Rakesh Yadav's salary.

32. (a) population of the village = 5500

After increament new population of the village = 6330

$$\% \text{ increment} = \frac{(6330 - 5500)}{5500} \times 100$$

$$= \frac{830}{55} = \frac{166}{11} \%$$

Male% : Female%

11% : 20%

$\frac{166}{11} \%$

Ratio of Male & Female $\rightarrow \left(\frac{166}{11} - 11 \right) : \left(20 - \frac{166}{11} \right)$

6 : 5 = 11

According to the question:-

$$11 \text{ units} = 5500$$

$$1 \text{ unit} = 500$$

$$\text{Number of females} = 500 \times 5 = 2500$$

33. (a) **Bhuvnesh : Saurabh**

$$\text{Ratio of salary} = 700 : 400$$

$$\left[75\% = \frac{3}{4} \right]$$

Note :- Assume any value of salaries which can not make fractions but remember one thing ratio should not be changed.

According to the question:-

Bhuvnesh :	Saurabh
Old salary $\rightarrow$ 700 :	400
$\downarrow +40\%$	$\downarrow +25\%$

New salary $\rightarrow$ 980	500
$+480$	

Percent of Bhuvnesh's salary more than

$$\text{Saurabh's salary} = \frac{480}{500} \times 100 = \frac{480}{5} = 96\%$$

34. (d) The data is in-sufficient since the number of matches to be played by India this year is not given. (You can not assume that they will play 40 Matches).

35. (c) **men : women : children**

700 : 500 : 800

$\downarrow 80\%$	$\downarrow 60\%$	$\downarrow 90\%$
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Not Indian $\rightarrow$ 560 : 300 : 720

Total people inside the premises

$$= (700+500+800) = 2000$$

Total people who were not Indian

$$= 560 + 300 + 720 = 1580$$

$$\% \text{ people who were not Indian} = \frac{1580}{2000} \times 100 = 79\%$$

36. (a)

1 Cow :	1 Calf
Old Cost $\rightarrow$ 2000 :	1400
$\downarrow +20\%$	$\downarrow +30\%$
New Cost $\rightarrow$ 2400	1820

According to the question :-

$$\text{Price of 1 dozen cows} = 2400 \times 12 = 28800$$

$$\text{Price of 2 dozen calves} = 1820 \times 24 = 43680$$

$$\text{Total cost} = 28800 + 43680 = \text{Rs. } 72,480$$

37. (a) According to the question :-

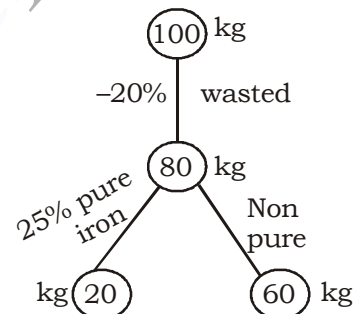
$$0.5x \text{ metres} = 1 \text{ bottle}$$

$$1 \text{ metre} = \frac{1}{0.5x} \text{ bottle}$$

$$400 \text{ metres} = \frac{1}{0.5x} \times 400 = \frac{800}{x} \text{ bottles}$$

38. (b) Let the total quantity of hematite mined = 100 kg.

According to the question:-



$$\therefore 20 \text{ units} = 80,000 \text{ kg}$$

$$1 \text{ unit} = 4,000 \text{ kg}$$

$$\text{Total hematite} = 100 \times 4000 = 4,00,000 \text{ kg}$$

39. (d) The total cost of truck for a year =

$$2,50,000 + \frac{250,000 \times 2}{100} + 2000 = \text{Rs. } 257000$$

To get a return of 15% he must earn annually

$$= \frac{257000 \times 15}{100} = \text{Rs. } 38550$$

$$\text{Hence, monthly rent} = \frac{38550}{12} = \text{Rs. } 3212.50$$

40. (b) Note :- In such type of question no need to calculate actual Market price and selling price. We can simply calculate the ratio on the basis of given fractions to save our valuable time.

According to the question:-

Condition (I) :- Let Market price = 8 Rs.

$$\therefore \text{Selling price} = 8 \times \frac{7}{8} = 7 \text{ Rs}$$

$$\% \text{ Discount} = \frac{(8-7)}{8} \times 100 = 12\frac{1}{2}\%$$

Condition (II) :- Similarly

Selling price : Market Price
6 : 7

$$\% \text{ Discount} = \frac{1}{7} \times 100 = 14\frac{2}{7}\%$$

Hence, the second shirt is a better bargain.

41. (c) Let the total number of voters = 500

$$\begin{aligned} \text{Voters who vote for Rakesh Yadav} &= 500 \times \frac{4}{5} \\ &= 400 \end{aligned}$$

$$\text{Voters who vote for Bhuvnesh} = (500 - 400) = 100$$

Rakesh Yadav : Bhuvnesh
400 : 100

↓ 10%

[40]

↓ 20%

[20]

$$\text{Remaining Voters who voted} = (500 - 60) = 440$$

$$\text{Vote got by Rakesh Yadav} = (400 - 40) = 360$$

According to the question:-

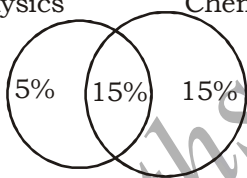
$$360 \text{ units} = 216$$

$$1 \text{ unit} = \frac{216}{360}$$

$$440 \text{ units} = \frac{216}{360} \times 440 = 264$$

$$\therefore \text{Total votes polled} = 264$$

42. (a) Physics Chemistry



[Failed venn diagram of students]

$$\text{Total failed students} = 5 + 15 + 15 = 35\%$$

$$\therefore \text{Total passed students} = (100 - 35) = 65\%$$

According to the question,

$$65\% = 325$$

$$1\% = \frac{325}{65}$$

$$\text{Total students (100\%)} = \frac{325}{65} \times 100 = 500$$

Total number of students appeared in the examination = 500

43. (c) Let the total salary of Rakesh Yadav = 100 units
Salary spent on house rent

$$= \frac{100 \times 30}{100} = 30 \text{ units}$$

$$\text{Remaining salary} = (100 - 30) = 70 \text{ units}$$

Salary spent on children's education

$$= \frac{70 \times 30}{100} = 21 \text{ units}$$

$$\text{Salary spent on clothes} = 100 \times \frac{24}{100} = 24 \text{ units}$$

$$\text{Remaining salary} = (100) - (30 + 21 + 24) = 25 \text{ units}$$

According to the question :-

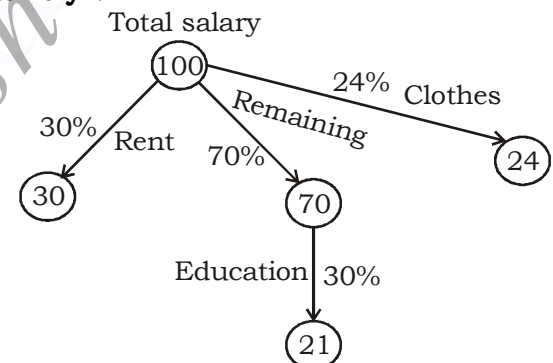
$$25 \text{ units} = 2500 \text{ Rs}$$

$$1 \text{ unit} = \frac{2500}{25} = 100 \text{ Rs}$$

$$100 \text{ units} = 100 \times 100 = 10000 \text{ Rs.}$$

$$\text{Total salary of Rakesh Yadav} = 10000 \text{ Rs.}$$

Alternatively :-



$$\text{Total spend money} = 30 + 21 + 24 = 75$$

$$\text{Remaining salary} = (100 - 75) = 25$$

According to the question :-

$$25 \rightarrow 2500$$

$$1 \rightarrow \frac{2500}{25}$$

$$\text{Total salary} = 100 \times \frac{2500}{25} = 10,000 \text{ Rs.}$$

44. (b) Ticket price $\times$ no. of people = total collection

$$\begin{aligned} 100 \times 100 &= 10000 \text{ Rs.} \\ \left(\begin{array}{l} +50\% \\ -17.5\% \end{array} \right) & \rightarrow x \times 150 = 8250 \text{ Rs.} \end{aligned}$$

$$x = \frac{8250}{150} = 55 \text{ Rs.}$$

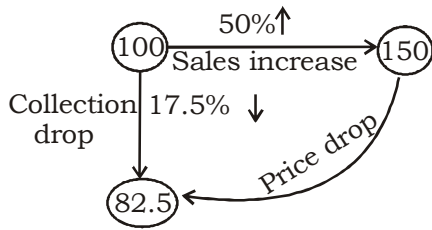
% difference of ticket's price

$$= \frac{100 - 55}{100} \times 100 = 45\%$$

$$\text{Now actual lowed price} = 250 \times \frac{45}{100} = 112.5$$

Alternate:-

According to the question :-
Final sales figure :-



$$\text{Required price drop} = \frac{(150 - 82.5)}{150} = \frac{67.5}{100} = 45\%$$

$$\text{Required value} = 250 \times \frac{45}{100} = \text{Rs.} 112.5$$

45. (a) Rakesh Yadav's monthly salary = A Rs.
Expenditure = X Rs.

Note :- [Savings = Income - expenditure]

According to the question :-

$$\text{New salary after increment} = \frac{A(100+C)}{100}$$

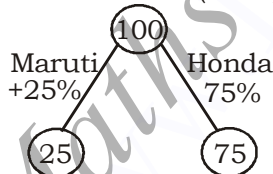
New expenditure after increament

$$= \frac{X(100+D)}{100}$$

$$\text{Savings} = \frac{A(100+C)}{100} - \frac{X(100+D)}{100}$$

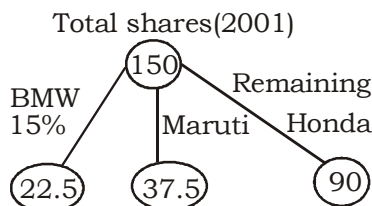
$$= A \left(1 + \frac{C}{100} \right) - X \left(1 + \frac{D}{100} \right)$$

46. (d) Let the total Market shares in 2000 = 100
Total shares(2000)



According to the question:-

$$\text{New market share in 2001} = 100 \times \frac{150}{100} = 150$$



$$\text{Maruti Shares} = 25 \times \frac{150}{100} = 37.5$$

$$\% \text{ share of Honda} = \frac{90}{150} \times 100 = 60\%$$

47. (c) Let the initial capital of the businessman = Rs.100

$$\text{Profit} = 100 \times \frac{50}{100} = \text{Rs.} 50$$

$$\text{Total capital} = (100 + 50) = \text{Rs.} 150$$

$$\text{Donation given} = 150 \times \frac{50}{100} = \text{Rs.} 75$$

$$\text{Remaining Capital after Donation} = (150 - 75) = \text{Rs.} 75$$

	Initial Capital	:	Donation
	100	:	75
First year →	4	:	3
II nd year →	4	:	3
III rd year →	4	:	3
	64	:	27
	↓ ×625		↓ ×625
	[40,000]		[16875]

$$\text{Capital for second year} = 4 \times 4 = 16$$

$$\text{Donation for second year} = 3 \times 3 = 9$$

$$\therefore 16 \text{ units} = \text{Rs.} 40,000$$

$$1 \text{ unit} = 2500$$

$$\text{Total donation} = 2500 \times 9 = \text{Rs.} 22500$$

Alternatively :-

Let the capital = x

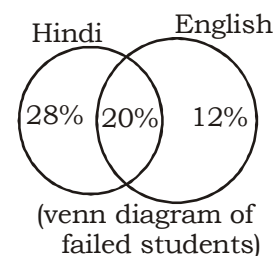
$$x \left(\frac{150}{100} \times \frac{50}{100} \right) \left(\frac{150}{100} \times \frac{50}{100} \right) \left(\frac{150}{100} \times \frac{50}{100} \right) = 16,875$$

Ist year IInd year IIIrd year

$$x \left(\frac{150}{100} \times \frac{50}{100} \right) \left(\frac{150}{100} \times \frac{50}{100} \right) = 22,500$$

Ist year IInd year

48. (b) Students failed in Hindi = 48%
Students failed in History = 32%



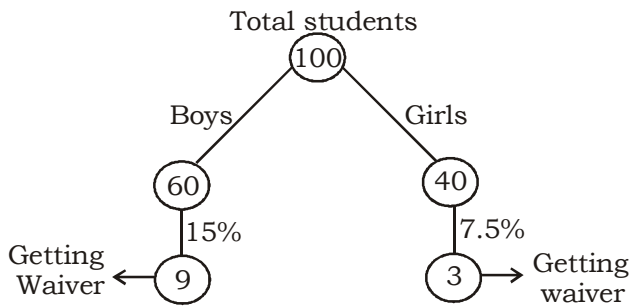
Number of students passed in the examination
 $= (100 - 60) = 40\%$

According to the question,
 $40\% = 880$

$$1\% = \frac{880}{40}$$

$$\text{Total students} = \frac{880}{40} \times 100 = 2200$$

49. (d) Let the total number of students = 100



According to the question :-
 $(9 + 3) \text{ units} = 12$

$$1 \text{ unit} = \frac{90}{12}$$

The number students who are not getting waiver
 $= (100 - 12) = 88 \text{ units}$

Total number of students getting 50% concession

$$= 88 \times \frac{90}{12} \times \frac{1}{2} \Rightarrow 330$$

50. (b) Let the initial value of machine = x
 According to the question,

$$x \times \frac{90}{100} \times \frac{95}{100} \times \frac{90}{100} \times \frac{95}{100} = 146205$$

$$x = 2,00,000 \text{ Rs.}$$

Initial value of machine = Rs. 2,00,000

Alternatively :-

	Old value	New value
I st year →	10	9
II nd year →	20	19
III rd year →	10	9
IV th year →	20	19
	40000	29241
	↓ ×5	↓ ×5
	2,00,000	146205

Value of machine = Rs. 2,00,000

51. (c) Total character in the report = $25 \times 60 \times 75$

Let the new number of pages = n

$$\therefore n \times 55 \times 90 = 25 \times 60 \times 75$$

$$n = 22.72 \approx 23$$

$$n = 23$$

pages in initial = 25

New pages = 23

% change in the number of pages

$$= \frac{(25 - 23)}{25} \times 100 = 8\%$$

52. (c)

	Old value	New value
Research →	10	11
Raw materials →	5	6
Labour →	5	4
Advertisements →	4	5
Transportation →	2	3
	2000	3960
	+1960	

$$\% \text{ change in the price of soap} = \frac{1960}{2000} \times 100 = 98\%$$

Note:- For your easy calculations you can simplify the one side ratio to other side.

53. (c) Let the initial salary of Rakesh Yadav = 8

$$\therefore \text{After raises, new salary} = 8 \times \frac{15}{8} = 15$$

Note:- Now take help from options to save your valuable time.

Let option (c) first time raised = 25%

$$\therefore \text{salary} = 8 \times \frac{125}{100} = 10$$

New raises will be double of the previous raises.

$\therefore$ IInd raises = 50%

$$\text{salary after IInd raises} = 10 \times \frac{150}{100} = 15$$

So it is satisfy the question condition so option (c) is correct.

Alternatively :-

Initial Salary : Final salary

$$8 \xrightarrow{+7} 15$$

$$\% \text{ change} = \frac{7}{8} \times 100 = 87.5\%$$

Note :- Now go through options and use the for-

$$\text{mula.} \quad \left[x + y + \frac{xy}{100} \right]$$

Option (c) First raise = 25%

IInd raise = 50%

$$\% \text{ Change} = 25 + 50 + \frac{25 \times 50}{100} = 87.5\%$$

It is same as above so option (c) is correct.

Alternatively:-

Let first raise = x%

$$\frac{7}{8} \times 100 = x + 2x + \frac{2x^2}{100}$$

$$x^2 + 150x - 4375 = 0$$

$$x^2 + 175x - 25x - 43750 = 0$$

$$x = 25, -175$$

$$\% \text{ change} = 25\%$$

54. (d) Ratio of Bhuvnesh salary :-

Case (i) October : November

$$\frac{3}{2} : 1 + \frac{1}{3}$$

$$9 : 8$$

Case (ii) November : December

$$2 : 2 + \frac{2}{3}$$

$$3 : 4$$

Combine both the cases then Ratio of Bhuvnesh' salary:-

$$\begin{array}{ccccc} \text{October} & : & \text{November} & : & \text{December} \\ 27 & : & 24 & : & 32 \\ & & & & \uparrow +5 \end{array}$$

According to the question :-

$$5 \text{ units} = 40 \text{ Rupees}$$

$$1 \text{ unit} = 8 \text{ Rupees}$$

$$83 \text{ units} = 8 \times 83 = 664 \text{ Rs.}$$

$$\text{Bonus} = 664 \times \frac{40}{100} = 265.6 \text{ Rupees}$$

55. (a) Initial salary = 100 Rs.

New salary after increment = 140.49 Rs.

$$\% \text{ Change} = \frac{40.49}{100} \times 100 = 40.49\%$$

Note:- Now take help from options and use this given below formula

$$\left[x + y + \frac{xy}{100} \right]$$

$$\text{Option (c) } \% \text{ rise in 2nd year} = 12 + 12 + \frac{12 \times 12}{100} = 25.44\%$$

$$\% \text{ rise in IIIrd year} = 25.44 + 12 + \frac{25.44 \times 12}{100}$$

$$= 37.44 + 3.0528 = 40.4928 \%$$

It satisfy the question condition so option (c) is correct.

Alternatively:-

Initial salary = 100 Rs.

New salary after increment = 140.49 Rs.

$$\% \text{ Change} = \frac{40.49}{100} \times 100 = 40.49\%$$

Let first rise = x%

$$40.49 = 3x + \frac{3x^2}{100} + \frac{x^3}{100^2}$$

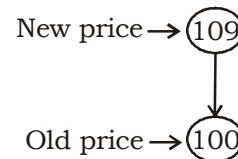
$$x = 12$$

Hence, first % rise in salary = 12%

56. (b) Note : In such type of questions assume any value of Cost price, which is easier for your calculation.

Let Cost price of Sofa = 100 Rs.

$$\begin{aligned} \text{After sales tax price of Sofa} &= 100 \times \frac{109}{100} \\ &= \text{Rs}109. \end{aligned}$$



$$\% \text{ discount} = \frac{(109 - 100)}{109} \times 100$$

$$\% \text{ discount} = \frac{900}{109} = 8.26 \%$$

Alternatively:-

$$\% \text{ reduction} = \frac{R}{100+R} \times 100 \%$$

$$= \frac{9}{100+9} \times 100 \% = \frac{900}{109} = 8.26\%$$

57. (c) % Increase in consumption

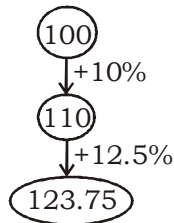
$$\frac{(225 - 200)}{200} \times 100 = 12.5\%$$

Now total rise in economy

$$\Rightarrow 10 + 12.5 + \frac{10 \times 12.5}{100} = 23.75\%$$

Alternatively :-

Let the price =



Final rise in economy = 23.75%

58. (d) Marks obtained of Rakesh Yadav in English

$$= 100 \times \frac{65}{100} = 65$$

Marks obtained by Rakesh Yadav in History

$$= 100 \times \frac{82}{100} = 82$$

Total marks of exams = $(100 + 100 + 50) = 250$

$$\text{Aim to achieve marks} = \frac{250 \times 78}{100} = 195$$

Required marks in sociology = $195 - (65 + 82) = 48$

$$\% \text{ marks obtained in sociology} = \frac{48}{50} \times 100 = 96\%$$

59. (b) Let the total wealth of king Dashratha = 8 units
-
- According to the question,

$$\text{Money recieved by the first wife} = 8 \times \frac{1}{2} = 4$$

$$\text{Remaining wealth} = (8 - 4) = 4$$

$$\text{Money recieved by the II}^{\text{nd}} \text{ wife} = 4 \times \frac{1}{2} = 2$$

$$\text{Remaining wealth} = (4 - 2) = 2$$

$$\text{Money recieved by the third wife} = 2 \times \frac{1}{2} = 1$$

$$\text{Combined share} = (4 + 2 + 1) = 7 \text{ units}$$

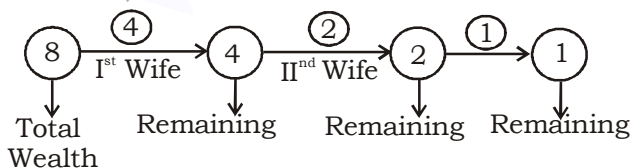
$$7 \text{ units} = 130,900$$

$$1 \text{ unit} = \frac{130,900}{7} = 18700$$

$$\text{Total wealth} = 8 \times 18700 = 1,49,600 \text{ kg}$$

Alternatively:-

Let total salary = 8 units



$$\text{Total shares recieved by the three wives} = 4 + 2 + 1 = 7$$

$$7 \text{ units} = 130,900$$

$$1 \text{ unit} = \frac{130,900}{7} = 18700$$

$$\text{Total wealth} = 8 \times 18700 = 14,9600 \text{ kg}$$

$$60. (a) \text{ I}^{\text{st}} \text{ year increament} = 8 + 1 + \frac{8 \times 1}{100} = 9.08\%$$

$$\text{II}^{\text{nd}} \text{ year increament} = 8 + 1 + \frac{8 \times 1}{100} = 9.08\%$$

Combined effect of two years

$$= 9.08 + 9.08 + \frac{9.08 \times 9.08}{100} = 18.984\%$$

Alternatively:-

Let the population = 100

According to the question,

Population after two years

$$= \left[100 \times \frac{108}{100} \times \frac{101}{100} \right] \times \frac{108}{100} \times \frac{101}{100} = 118.984\%$$

$$\% \text{ increament} = 118.984\% - 100\%$$

$$\% \text{ increament} = \underline{18.984\%}$$

$$61. (c) \begin{array}{lcl} \text{Initial population} & : & \text{Population after migration} \\ 10 & : & 9 \\ 10 & : & 9 \\ 10 & : & 9 \\ \hline 1000 & & 729 \end{array}$$

$$\text{Remaining population in Mexico} = 729$$

According to the question,

The ratio of male and female population are same before and after migration,

Male population : Female Population

$$2 : 1$$

Number of Females after migration

$$= \frac{729}{(2+1)} \times 1 = 243 \text{ units}$$

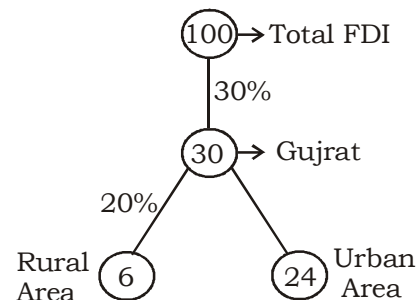
$$243 \text{ units} = 364500$$

$$1 \text{ unit} = \frac{364500}{243} = 1500$$

$$1000 \text{ units} = 1500 \times 1000 = 150,0000$$

$$\text{Initial population of the Mexico} = 150,0000$$

62. (a) Let the total FDI = 100 units
-
- Now According to the question :-



$$24 \text{ units} = \$ 72 \text{ m}$$

$$1 \text{ unit} = \$ 3 \text{ m}$$

$$\text{Total FDI} = 3 \times 100 = \$ 300 \text{ m}$$

$$\text{FDI for Andhra Pradesh} = \frac{300 \times 20}{100} = \$ 60 \text{ m}$$

$$\text{FDI for Rural Andhra Pradesh} = \frac{60 \times 50}{100} = \$ 30 \text{ m}$$

63. (c) Let the income of the family = 100 Rs.

$$\therefore \text{Expenditure on food} = 100 \times \frac{25}{100} = 25 \text{ Rs.}$$

$$\begin{aligned} \text{After increase of 20\% income} &= 100 \times \frac{120}{100} \\ &= \text{Rs. } 120 \end{aligned}$$

According to the question,

Expenditure is same in both cases.

$$\therefore \% \text{ expenditure} = \frac{25}{120} \times 100 = \frac{250}{12}$$

$$\% \text{ expenditure} = 20.833 \%$$

$$\begin{aligned} \% \text{ decrease in expenditure} &= 25 - 20.833 \\ &= 4.16 \% \end{aligned}$$

64. (c)

	Old	:	New
Length $\rightarrow$	20	:	19
Breadth $\rightarrow$	20	:	19
Height $\rightarrow$	5	:	6
Volume $\rightarrow$	2000	:	2166

$\xrightarrow{+166}$

$$\begin{aligned} \% \text{ change in volume} &= \frac{166}{2000} \times 100 = \frac{166}{20} \\ &= 8.3 \% \end{aligned}$$

65. (c) Let the salary of A and B are x and y respectively.

According to the question:-

$$x \times \frac{125}{100} \times \frac{80}{100} = y \times \frac{120}{100} \times \frac{75}{100}$$

$$10x = 9y$$

$$\frac{x}{y} = \frac{9}{10} \Rightarrow \frac{y}{x} = \frac{10}{9}$$

$$\frac{\text{Ratio of B's salary}}{\text{Ratio of A's salary}} = \frac{10}{9}$$

Alternatively :-

Note :- You can also take help from options.

$$\text{option (c)} \quad \frac{\text{B's salary}}{\text{A's salary}} = \frac{10}{9}$$

Assume B's salary = 100,

$\therefore$ A's salary = 90

According to the question,

$$\text{Condition (I) A's salary} = 90 \times \frac{125}{100} \times \frac{80}{100} = 90$$

$$\text{Condition (II) B's salary} = 100 \times \frac{120}{100} \times \frac{75}{100} = 90$$

Both conditions are same. So option (c) is correct.

66. (a) Let the income of the person = 100 Rs.

$$\therefore \text{Savings} = \frac{100 \times 6}{100} = 6 \text{ Rs.}$$

$$\text{Old expenditure} = (100 - 6) = 94 \text{ Rs.}$$

After two years income of the person

$$= 100 \times \frac{115}{100} = 115 \text{ Rs.}$$

$$\text{New savings} = 6$$

$$\text{New expenditure} = 115 - 6 = 109 \text{ Rs.}$$

$$\% \text{ increase in expenditure} = \frac{(109 - 94)}{94} \times 100$$

$$= \frac{1500}{94} = 15.95 \%$$

67. (b) Let B = 100

	A	:	B	:	C	:	D
Initial $\rightarrow$	150	:	100	:	100	:	160
	$\downarrow +10\%$		$\downarrow +10\%$		$\downarrow +10\%$		$\downarrow +10\%$
New $\rightarrow$	165		110		110		176

$$\% \text{ Value} = \frac{176}{110} \times 100 = 160 \%$$

Note:- The ratio does not change if all the values are incremented by the same percentage value.

68. (d) They left with 85% money it means they spent 15%.

$\therefore$ By alligation method,

A	:	B
12%	:	20%
(15%)		
Ratio of sum $\rightarrow$	5	: 3 = 8

$$\text{Amount of A} = \frac{1200}{8} \times 5 = \text{Rs. } 750$$

$$\text{Amount of B} = \frac{1200}{8} \times 3 = \text{Rs. } 450$$

After spending of 12%, amount left with

$$A = \frac{750 \times 88}{100} = \text{Rs. } 660$$

- 69 (c) Bhuvnesh's amount = B Rs. [Given]
Saurabh's amount = S Rs.

According to the question,

Saurabh would spend 12% of Bhuvnesh.

Let Saurabh's expenditure = $x\%$

$$S \times \frac{x}{100} = \frac{12B}{100}$$

$$x = \frac{12B}{S}$$

$$\therefore \text{Saurabh's expenditure} = \frac{12B}{S}$$

70. (c) Weekly changes = 168,000 Rs.

$$\begin{aligned} \text{Gross collection increase per day} &= \frac{168000}{7} \\ &= 24000 \text{ Rs.} \end{aligned}$$

71. (d) Note:- In such type of questions assume ratio of values according to your need but remember values ratio should be same as given in question.

	A	:	B	:	C
Population →	900	:	800	:	300
	↓ 80%		↓ 70%		↓ 90%
Literate →	720		560		270
Total population	= (900 + 800 + 300) = 2000				
Literate population	= (720 + 560 + 270) = 1550				

$$\% \text{ literacy of town} = \frac{1550}{2000} \times 100 = 77.5\%$$

72. (b) Let the numerator of a fraction = x
Let the denominator of a fraction = y

$$\therefore \text{fraction} = \frac{x}{y}$$

According to the question :-

$$\frac{2x \times \frac{110}{100}}{3y \times \frac{70}{100}} = \frac{16}{21} \times \frac{11}{100}$$

$$\frac{2x \times 110}{3y \times 70} = \frac{16 \times 11}{2100} \Rightarrow \frac{x}{y} = \frac{2}{25}$$

73. (b) Let the total marks in the examination = 100

$$\text{Pass Marks} = 100 \times \frac{40}{100} = 40$$

$$\text{Marks obtained by A} = \frac{40 \times 90}{100} = 36$$

$$\text{Marks obtained by B} = 36 \times \frac{8}{9} = 32$$

$$\left[\therefore 11.11\% = 11\frac{1}{9}\% = \frac{1}{9} \right]$$

$$\begin{aligned} \text{Combined Marks obtained by (A + B)} \\ &= 36 + 32 = 68 \end{aligned}$$

$$\begin{aligned} \text{Required marks for C to pass the exam} \\ &= 68 - 40 = 28 \end{aligned}$$

$$\% \text{ marks for C} = \frac{28}{68} \times 100 = 41\frac{3}{17}\%$$

74. (a) $12.5\% = \frac{1}{8}$, $8\% = \frac{2}{25}$

	Old	New
Wages →	8	9
Hours →	25	23
Weekly wages →	200	207

$$\% \text{ change in the weekly wages} = \frac{7}{200} \times 100 = 3.5\%$$

Alternatively:-

By successive method,

$$\% \text{ change} = x + y + \frac{xy}{100} = 12.5 - 8 - \frac{12.5 \times 8}{100} = 3.5\%$$

75. (c) Let the third number = 100

X	:	Y	:	Z
80	:	72	:	100

% Less value of Y than the number X

$$= \frac{8}{80} \times 100 = 10\%$$

76. (d) Let the original price = y Rs.

According to the question,

$$y \times \frac{(100 + x)}{100} \times \frac{(100 - x)}{100} = \frac{k}{100}$$

$$y = \frac{100k}{(100 + x)(100 - x)}$$

$$y = \frac{100k}{(100^2 - x^2)}$$

77. (d) Let the initial salary of the person = x Rs
According to the question,

$$(x + 4800) \frac{10}{100} = x \times \frac{12}{100}$$

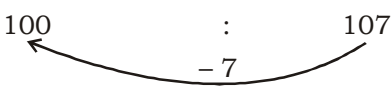
$$5x + 24000 = 6x$$

$$x = 24000 \text{ Rs.}$$

$$\begin{aligned} \text{increased salary of the person} &= 24000 + 4800 \\ &= \text{Rs. } 28800 \end{aligned}$$

78. (a) Let the cost price of the radio = 100 Rs.
Rate of the sales Tax = 7 % [Given]
Final value of the radio after sales tax

$$= 100 \times \frac{107}{100} = 107 \text{ Rs.}$$

Initial value (CP)	:	Final value
100	:	107
		

According to the question,

$$100 \text{ units} = 2568$$

$$1 \text{ unit} = \frac{2568}{100}$$

$$7 \text{ units} = \frac{2568}{100} \times 7 = 179.76 \approx 180$$

$$\therefore \text{Reduction in the price} = 180 \text{ Rs.}$$

79. (c) Student wanted to buy 25 tickets.
Minimum price occurred at :-

$$\text{Total cost} = 18 \times 40 \times \frac{75}{100} + \frac{6 \times 90 \times 40}{100} + 1 \times 40$$

$$\text{Total cost} = 540 + 216 + 40$$

$$\text{Total cost of 25 tickets} = 796 \text{ Rs.}$$

$$\text{Minimum price per ticket} = \frac{796}{25} = 31.84 \text{ Rs.}$$

80. (d) Maximum price = $24 \times 40 \times \frac{90}{100} + 1 \times 40$
 $= 864 + 40 = 904$

$$\text{Required maximum price} = \frac{904}{25} = 36.16 \text{ Rs.}$$

81. (c) New chart of discount on tickets

Ticket lot	→	3	6	9
Percentage Discount	→	10%	20%	25%

$$\text{Price of 9 tickets} = 9 \times 40 \times \frac{75}{100} = \text{Rs. } 270$$

$$\text{Price of 6 tickets} = 6 \times 40 \times \frac{80}{100} = \text{Rs. } 192$$

$$\begin{aligned} \text{Now total price of 15 tickets} &= (270 + 192) \\ &= 462 \end{aligned}$$

$$\text{Now he can buy only a new ticket} = 40 \text{ Rs.}$$

$$\text{Total amount} = (462 + 40) = 502 \text{ Rs.}$$

Now there is no other way to buy the tickets.

So he can buy maximum number of tickets 16.

82. (b) According to the question,
1 man is married to 1 woman. [Given]
 $\therefore 45\% \text{ men} = 25\% \text{ of women}$
 $45m = 25w$ [m = men, w = women]

$$\frac{m}{w} = \frac{5}{9}$$

$$m : w = 5 : 9$$

$$\text{Let the number of men} = 500$$

$$\text{Let the number of women} = 900$$

$$\text{Number of adult men} = \frac{500 \times 45}{100} = 225$$

$$\text{Number of adult women} = \frac{900 \times 25}{100} = 225$$

$$\% \text{ married population} = \frac{(225 + 225)}{(900 + 500)} \times 100$$

$$= \frac{450}{14} = 32.14\%$$

83. (c) $33.33\% = 33 + \frac{1}{3}\% = \frac{1}{3} \leftarrow \text{weight of 50\% water}$
 $\frac{1}{3} \leftarrow \text{weight of bucket}$

$$\text{Let the initial capacity of the bucket} = 3$$

$$\text{weight of 100\% water} = 2$$

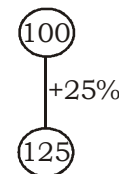
Ratio of the required weight of the bucket to the water when full is 3 : 2

If both the weights (bucket and water) are integers, then the total weight must be a multiple of $(3 : 2 = 3 + 2 =) 5 \text{ kg.}$

So only option (c) is correct.

84. (d) We don't have the sufficient data to solve the question.

85. (a) Let the initial price = 100 Rs.



$$\% \text{ drop in consumption} = \frac{(125 - 100)}{125} \times 100 = 20\%$$

According to the question,

$$20\% \text{ of the original consumption} = 20 \text{ kg}$$

$$1\% \text{ of the original consumption} = \frac{20}{20} \text{ kg}$$

$$100\% \text{ of the original consumption} = \frac{20}{20} \times 100 = 100 \text{ kg}$$

$$\text{So original consumption} = 100 \text{ kg}$$

$$\text{New consumption} = 100 \times \frac{80}{100} = 80 \text{ kg}$$

$$\text{The increased price of rice} = \frac{400}{80} = 5 \text{ Rs/kg}$$

Alternatively:-

Due to a 25% hike in price of rise, net effect =

$$400 \times \frac{25}{100} = 100$$

$$\text{Increased price of rise} = \frac{100}{20} = 5 \text{ Rs./kg}$$

86. (b) According to the question :-

$$1200 + \left(10000 \times \frac{10}{100} + 1200 \times \frac{50}{100} \right) n = 7600$$

$$1200 + 1600n = 7600$$

$$n = 4$$

[where n is the number of sales. $n \geq 10000$]

$$\text{Total sales} = 10000 + 4 \times 10000$$

$$\text{Total sales} = 50000 \text{ Rs.}$$

Note:- The incentive scheme does not operate for the first Rs. 10000 of sales.

87. (b) $1200 + 1600n \neq 9000$

A sales value of Rs 9000 can not be achieved at any value of n.

88. (c) According to question,

$$40\% \Rightarrow 220 + 20 = 240$$

$$\therefore 100\% \Rightarrow \frac{240}{40} \times 100 = 600$$

89. (d) last month's salary = 10,000

Last month ratio,

Saving : Expenditure

$$2 : 13 \quad (\text{for last month})$$

$\therefore$ Savings of this month

$$= 50\% \text{ of } \frac{2}{15} \times 10,000 = \frac{2000}{3}$$

$$\text{And, Income of this year} = 115\% \text{ of } 10,000 = 11,500$$

$\therefore$ Expenditure of this year

$$= 11,500 - \frac{2000}{3} = \frac{32500}{3} = 10,833.33 \text{ Rs.}$$

$$90. (a) \left[\begin{array}{l} \therefore 15\% = \frac{3}{20} \\ 25\% = \frac{1}{4} \end{array} \right]$$

	Before	New
Raw material cost	20	23
	$\downarrow 25\%$	$\downarrow 30\%$
Labour cost	5	6.9
Total cost	25	29.9

Now for Keeping the expenditure same reduction in the usage of raw material.

$$\text{so, Required percentage} = \frac{4.9}{29.9} \times 100$$

$$\approx 16.38\%$$

$$91. (c) \begin{array}{cccc} & A & B & C & \text{Total time} \\ \text{Time allotted} & 500 & 400 & 200 & = 1100 \text{ hrs} \end{array}$$

$$\downarrow 40\% \quad \downarrow 30\% \quad \downarrow 20\%$$

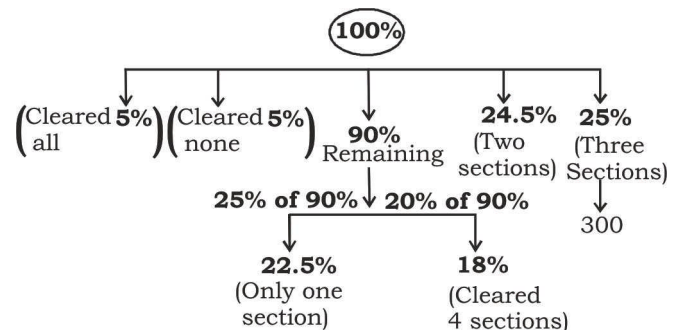
$$\text{Time invested} \quad 200 \quad 120 \quad 40 = 360 \text{ hrs}$$

$$\text{Required percentage} = \frac{360}{1100} \times 100 = 32.72\%$$

Note:- there is no need to use waste time in this questions.

92. (b) Let the total candidates appeared in SSC test = 100%

According to the question



$$25\% = 300$$

$$100\% = 1200$$

$$\therefore \text{Total candidates appeared} = 1200$$

93. (c) According to the question,

Note:- Half as large again means an increase of 50% and A, B and C are three galleries.

Case (I):- $A + B : A + B + C$

Efficiency $\rightarrow 2 : 3$

Case (II):- $12B = 4(A + C)$

On adding $4B$ both sides,

$$12B + 4B = 4(A + B + C)$$

$$16B = 4 \times 3$$

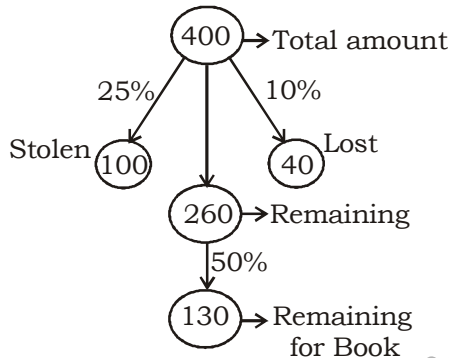
$$B = \frac{3}{4}$$

$$\text{Then, } A = 2 - \frac{3}{4} = \frac{5}{4}$$

$$\text{Required percentage} = \frac{B}{A} \times 100 = \frac{\frac{3}{4}}{\frac{5}{4}} \times 100$$

$$= \frac{3}{5} \times \frac{4}{4} \times 100 = 60\%$$

94. (d) Let the total amount = 400 units
According to the question:-



$$130 \text{ units} = 26 \text{ Rs.}$$

$$1 \text{ unit} = \frac{26}{130} \text{ Rs.}$$

$$400 \text{ units} = \frac{26}{130} \times 400 = \text{Rs. } 80$$

95. (d) Since 90% of the total votes have been polled.
So, Let total votes $A + B + C = 100\%$
(total vote polled i.e. 90% of the total votes)
According to the question :-

$$R = B \left(100 + \frac{50}{100}\right) = \frac{3}{2} B$$

$$R - S = 18,000$$

$$B = 5\% + S$$

$$\text{And } R = \frac{3}{2} B = \frac{3}{2} (5\% + S)$$

$$\text{Now } R + B + S = 100\%$$

$$\frac{3}{2} (5\% + S) + (5\% + S) + S = 100\%$$

after solving

$$\Rightarrow S = 25\%$$

$$\Rightarrow B = 30\%$$

$$\Rightarrow R = 45\%$$

$$\text{Again } R - S = 18,000$$

$$20\% = 18,000$$

$$\text{Total votes polled } 100\% = 90,000$$

Hence,

$$\text{Total votes} = \frac{10}{9} \times 90,000 = 1,00,000$$

96. (b) Hike in Petrol price

$$\text{Rs. } 28 \xrightarrow[\text{Rs. } 1.96]{+7\%} \text{Rs. } 29.96$$

$$\text{Petrol consumption per month} = \frac{2400}{18}$$

$$= \frac{400}{3} \text{ litres}$$

$$\text{Increase in expenditure} = \frac{400}{3} \times 1.96$$

$$= 261.33 \approx 262 \text{ Rs.}$$

97. (a) Since neither of the customer has purchased of more than Rs. 6000 so only two option will be there for the customer

	(I) option Discount of 15%	(II) option Reselling of his ticket at 4%
Total amount $\rightarrow$	40,000	40,000
Amount discounted $\rightarrow$	- 6000	- 1600
Revenue for Shopkeeper $\rightarrow$	34,000	38,400

Hence maximum revenue generated for the shopkeeper = 38,400 Rs.

98. (b)
- | | | |
|--------|----------|-----------|
| | Left eye | Right eye |
| Vision | 72 | 68 |

$$\downarrow +15\% \quad \downarrow +11\%$$

$$\text{Increased vision } 82.8 \quad 75.48$$

$$\text{Rakesh eyesight} = 82.8 \times 75.48$$

$$\text{Normal person's eyesight} = 100 \times 100$$

Required percentage

$$= \frac{82.8 \times 75.48}{100 \times 100} \times 100$$

$$= 62.497 \% \approx 62.5 \%$$

99. (d) According to question,

$$x + x\% \text{ of } 150 = 150$$

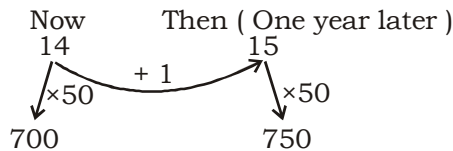
$$\Rightarrow x + \frac{x}{100} \times 150 = 150$$

$$\Rightarrow x + \frac{3}{2}x = 150$$

$$\Rightarrow \frac{5x}{2} = 150 \Rightarrow x = 60$$

i.e. number of boys = $x = 60$

100. (c) As, $7.14\% = \frac{1}{14}$



The population of the Mukherjee Nagar after one year = 750.

101. (b) No. of Matches lost = 3

Total Matches = 24

$$\text{Percentage of matches lost} = \frac{3}{24} \times 100 = 12\frac{1}{2}\%$$

102. (d) Let x be the initial amount

$$\text{Remaining money} = x \times \left(\frac{9}{10}\right) \times \left(\frac{9}{10}\right) \times \left(\frac{9}{10}\right)$$

According to the question :-

$$x \times \frac{9}{10} \times \frac{9}{10} \times \frac{9}{10} = 7290$$

$$x = 10,000$$

Alternatively:-

	Initial	Remaining after paid
Wife	10	9
Hospital	10	9
Relief Fund	10	9
	<u>1000</u>	<u>729</u>
	$\downarrow \times 10$	$\downarrow \times 10$
	[10,000]	[7290]

103. (c) According to the question :-

$$n \times \frac{90}{100} \times \frac{80}{100} \times \frac{75}{100} = 270$$

$$n = \frac{270 \times 10 \times 10 \times 100}{9 \times 8 \times 75}$$

$$n = 500 \text{ chocolates}$$

Alternatively:-

	Initial Chocolates :	After purchasing Chocolates
I st customer	$\rightarrow 10$	9
II nd customer	$\rightarrow 5$	4
III rd customer	$\rightarrow 4$	3
	<u>200</u>	<u>108</u>

According to the question:

$$108 \text{ units} = 270$$

$$1 \text{ unit} = \frac{270}{108}$$

$$200 \text{ units} = \frac{270}{108} \times 200$$

$$= 500$$

$$\text{Total chocolates (n)} = 500$$

$$104. (c) 100 \xrightarrow{+15\%} 115 \xrightarrow{-15\%} 97.75\%$$

Alternatively:-

When the price is increased and then decreased by the same percentage (say $a\%$) There is always a loss.

$$\text{Loss \%} = \frac{a^2}{100}\%$$

$$\text{Loss \%} = \frac{(15)^2}{100}\%$$

$$= 2.25\% \text{ (loss)}$$

105. (b) Let the salary of B = 100

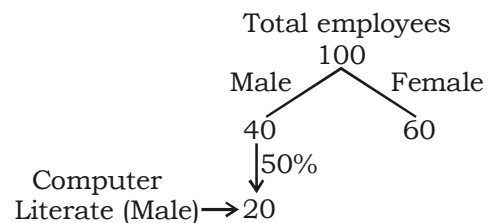
A	:	B	:	A + B
50		100		150
$\downarrow +50\%$		$\downarrow -25\%$		$\downarrow +50$
75		125		200

Percentage increase in combined salaries

$$= \frac{50}{150} \times 100$$

$$= 33.33\%$$

106. (b) Let the total employees = 100



Total percentage of male computer literate = 20%

total percentage of female computer literate

$$= 62\% - 20\% = 42\%$$

Hence no. of female literates

$$= \frac{42}{100} \times 1600 = 672$$

Hence option (b) is correct.

107. (b) According to the question :

Sales tax on 12,000 →

Sales tax on 6,000 →

$$\begin{aligned} x\% \text{ of } 2,000 + y\% \text{ of } 10,000 &= 680 \dots (1) \\ x\% \text{ of } 2,000 + y\% \text{ of } 4,000 &= 320 \dots (2) \\ \hline y\% \text{ of } 6,000 &= 360 \\ \Rightarrow y &= 6 \\ \text{and } x &= 4 \end{aligned}$$

Hence, $x - y = -2$

108. (c) Let the number be N then,

$$N^2 + 40\% \text{ of } N = 4040\% \text{ of } N$$

$$N^2 + \frac{2}{5} N = \frac{4040}{100} \times N$$

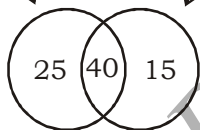
$$N \left(N + \frac{2}{5} \right) = \frac{202}{5} \times N$$

$$N = \frac{202}{5} - \frac{2}{5}$$

$$N = 40$$

Required Number N = 40

109. (d) Passed student in Physics Passed student in Chemistry



Student passed in Physics = $(100 - 35) = 65\%$

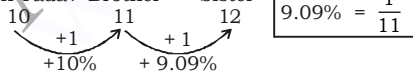
Student passed in Chemistry = $(100 - 45) = 55\%$

Student passed in either one or both subjects
= $(65 + 55 - 40) = 80\%$

Hence student failed in both subjects

$$= 20\% = \frac{20}{100} \times 600 = 120$$

110. (c) Rakesh Yadav Brother Sister



$$\text{Salary of his wife} = 23 - \frac{13}{23} \times 23$$

$$= 10 \left[\because 56 \frac{12}{23} \% = \frac{13}{23} \right]$$

Hence the salary of the his wife is equal to his salary.

111. (b) Time duration of advertisements

$$= (60 \times 8 + 16 \times 30) \text{ sec}$$

$$= 16 \times 60 \text{ sec} = 16 \text{ min}$$

Total time for the programmes telecasting

$$= 16 \text{ hours.}$$

Percentage of the time devoted in advertisements

$$= \frac{16}{16 \times 60 \text{ min}} \times 100\%$$

$$= 1.66\%$$

112. (d) Let 1 Rs. be paid for 1 unit of land.

Then cultivated taxable land = 3,84,000 units

And the taxable land of Rakesh = 480 units

$$\begin{aligned} \text{Hence total land of Rakesh} &= \frac{100}{60} \times 480 \\ &= 800 \text{ units} \end{aligned}$$

$$\text{Required Percentage} = \frac{800}{3,84,000} \times 100 = .208\%$$

113. (b) Before Fresh mangoes + Packaging = Cost

$$\begin{array}{ccccc} 100 & \xrightarrow{+40\%} & 40 & = & 140 \\ \downarrow +30\% & & \downarrow -50\% & & \\ 130 & & 20 & = & 150 \end{array}$$

$$\text{Percentage change} = \frac{150 - 140}{140} \times 100$$

$$= 7.14\% \text{ (increase)}$$

114. (c) Marks in Physics = 80 out of 100

Marks in Chemistry = 66 out of 100

Marks obtained in all subject

$$\frac{80}{100} \times (100 + 100 + 200) = \frac{80}{100} \times 400 = 320$$

So marks obtained in Maths = $320 - (80 + 66)$
= 174 out of 200

Percentage marks obtained in Maths

$$= \frac{174}{200} \times 100 = 87\%$$

115. (a) Total Votes Votes polled Total Valid votes

$$\begin{array}{ccccc} 100 & \xrightarrow{-25\%} & 75 & \xrightarrow{-\frac{1}{15}} & 70 \end{array}$$

Now, A has got $40\% = 40$ out of 70.

Then B + C has got = 30 votes

Hence A is the winner.

116. (a)

$$\begin{array}{lcl} \text{Before} & +\frac{1}{4} & \text{After increment} \\ \text{Salary of Bhuvnesh} \Rightarrow & B \xrightarrow{+\frac{1}{4}} & \frac{5}{4} B \\ \text{Salary of Saurabh} \Rightarrow & S \xrightarrow{+\frac{1}{8}} & \frac{9}{8} S \end{array}$$

$$\text{Given, } \frac{9}{8} S = 120\% \text{ of } \frac{5}{4} B$$

$$\frac{9}{8} S = \frac{6}{5} \times \frac{5}{4} B$$

$$S : B = 4 : 3$$

Salary of Bhuvnesh before increment

$$= \frac{3}{7} \times 28,000 = \$12,000$$

And salary of Bhuvnesh after increment

$$= \frac{5}{4} \times 12,000 = \$15,000.$$

117. (c)

$$\begin{array}{lcl} \text{Price} & 4 \xrightarrow{+25\%} & 5 \\ \text{Amount} & 10 \xrightarrow{70\%} & 7 \\ \text{Expenditure} & 40 \longrightarrow & 35 \end{array}$$

$$\begin{aligned} \text{Reduction in expenditure} &= \frac{40 - 35}{40} \times 100 \\ &= 12.5\% \text{ less} \end{aligned}$$

$$\begin{array}{lcl} \text{118. (d) Case (i)} & \text{Party P : } (500-3x) & \text{Party Q : } 3x \\ & & \text{Majority : } (500-6x) \times 2 \\ \text{Case (ii)} & (500-4x) & 4x = (8x-500) \end{array}$$

According to the question,

$$(500 - 6x) \times 2 = 8x - 500$$

$$1000 - 12x = 8x - 500$$

$$20x = 1500$$

$$x = \frac{1500}{20} = 75$$

Number of seats of Q New government

$$= 75 \times 4 = 300$$

Note:- Majority means difference between the seats of parties.**Alternate :-****Note:-** In such type of questions take help from options to save your valuable time.

Taking option (d),

No. of seats of Q in the new parliament = 300

$$\begin{array}{lcl} \text{P} & \text{Q} & \\ \text{Old} & 275 & 225 \xrightarrow{+\frac{1}{3}} \text{difference} = 50 \\ \text{New} & 200 & 300 \xrightarrow{+\frac{1}{3}} \text{difference} = 100 \end{array} \times 2$$

Hence in the new government party Q enjoy twice the majority. Hence option (d) is correct

119 (b) 5% of the girls = 4 % of the boys

$$\frac{5}{100} \times G = \frac{4}{100} \times B$$

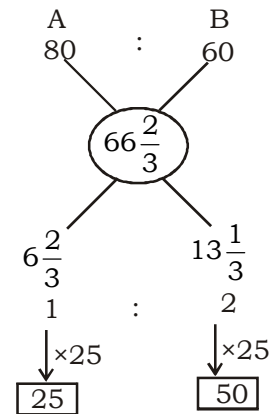
$$\frac{G}{B} = \frac{4}{5}$$

$$\text{No. of Girls in the school} = \frac{4}{9} \times 1800 = 800.$$

120. (c) In section A Rakesh Yadav answered

$$= \frac{20}{25} \times 100 = 80\%$$

So by Alligation method,



Total no. of questions in the test (n) = 75

121. (b)

Let Radha's salary = 100

After spending, salary left = 100 - (40 + 20 + 10 + 10) = 20

i.e. savings = 20

Ratio value **Original value**

$$\therefore 20 \longrightarrow 1500$$

$$1 \longrightarrow 75$$

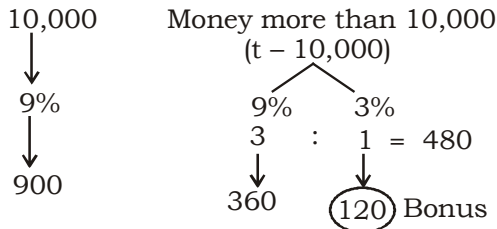
$$\therefore 100 \longrightarrow 7500$$

i.e. salary = Rs. 7500

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- 122.(a) Total votes = 7500
 $\therefore$ Invalid votes = 20% of 7500 = 1500
 $\therefore$ total valid votes = 7500 - 1500 = 6000
 $\therefore$ One candidate got 55% of the total valid votes.
 $\therefore$ Voters polled to another = 45% of 6000
 $= 2700$

- 123.(b) Let the total sales = Rs. t



Note:- Rs. 480 divided in the ratio of commission and bonus.

Received bonus by salesman = Rs. 120

Alternatively:-

$$\text{Commission on 10,000 (9\%)} = 10,000 \times \frac{9}{100} = 900$$

$$\text{Exceed commission (9\%+3\% = 12\%)} = 1380 - 900 = 480$$

$$\therefore 12\% = 480$$

$$\therefore 1\% = 40$$

$$\therefore 3\% = 120$$

- 124.(b) The businessman's earning after five years = Rs. 72,000

Let his earning be Rs. 100

After 1st year $\rightarrow$ 125 (25% increase)

After 2nd year $\rightarrow$ 120 (4 % decrease)

After 3rd year $\rightarrow$ 150 (25% increase)

After 4th year $\rightarrow$ 144 (4% decrease)

After 5th year $\rightarrow$ 180 (25% increase)

$$180 \text{ units} = 72000$$

$$1 \text{ units} = 400$$

$\therefore$ present earning (ratio value = 100)

$$= \text{Rs. } 40,000.$$

- 125.(a) The man invests Rs 1,200 at 10% p.a.

At the end of 1st year, the amount = Rs. 1320

$$\text{Withdrawl } \frac{30}{100} \times 1320 + 24 = \text{Rs. } 420$$

$$\therefore \text{Amount left (after one year)} = 1320 - 420 = \text{Rs. } 900$$

$$\therefore \text{At the end of 2nd year, the amount} = 900 + 10\% \text{ of } 900 = \text{Rs. } 990$$

$$\text{Money withdrawl} = \frac{30}{100} \times 990 + 93 = \text{Rs. } 390$$

$$\therefore \text{Money left (after 2nd year)} = 990 - 390 = \text{Rs. } 600$$

$$\therefore \text{Amount (at the starting of 3 year)} = 990 - 390 = \text{Rs. } 600$$

$$\therefore \text{Amount at the end of 3 years} = 600 + 10\% \text{ of } 600 = \text{Rs. } 660$$

- 126.(c) Average earning of each member of

Sahara Ambani

$$100 \xrightarrow{-20\%} 80$$

Total earning of each family

Sahara Ambani

$$100 \xrightarrow{+20\%} 120$$

No. of family member

Sahara Ambani

$$\frac{100}{100} : \frac{120}{80}$$

$$4 : 6$$

% no. of family member of Sahara is that of Ambani

$$= \frac{4}{6} \times 100 = 66.66\%$$

- 127.(b) Let original price in year 2000 be P rupees.

Price of the computer in year 2006.

$$= \left(\frac{11}{10} \times \frac{11}{10} \times \frac{11}{10} \times \frac{9}{10} \times \frac{9}{10} \times \frac{9}{10} \right) P$$

$$= \frac{970299}{10,00,000} P$$

$$\text{Reduction} = P - \frac{970299}{10,00,000} P = \frac{29701}{10,00,000} P$$

Hence % reduction in price

$$= \frac{29701}{10,00,000} \times 100 = 2.97 \approx 3\%$$

Alternatively :-

	Old	New
2001	10	11
2002	10	11
2003	10	11
2004	10	9
2005	10	9
2006	10	9

$$1,00,000 \quad 970299$$

$$\text{Reduction} = 1,00,000 - 970299 = 29701$$

$$\% \text{ Reduction} = \frac{29701}{10,00,000} \times 100 = 2.97\% \approx 3\%$$

128. (c) Let no. of new pages be P_2 then,

$$30 \times 25 \times 35 = P_2 \times 30 \times 28$$

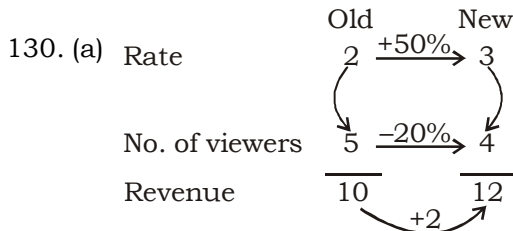
$$P_2 = \frac{125}{4} = 31.25$$

$\Rightarrow P_2 = 32$ pages (pages will always be integers)

$$\text{So, Required percentage} = \frac{2}{30} \times 100 = 6.66\%$$

129. (c) Increase in the price of sugar = (rate of inflation + 2%) = $(8 + 2) = 10\%$

$$\begin{aligned} \text{Price of the sugar in 2006} &= 20 \times \frac{11}{10} \times \frac{11}{10} \\ &= 24.20 \text{ Rs.} \end{aligned}$$



$$\text{Required percentage} = \frac{2}{10} \times 100 = 20\% \uparrow$$

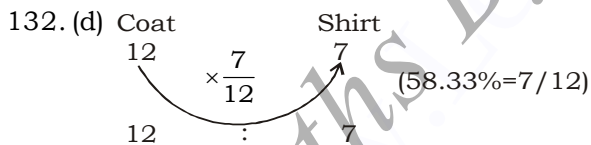
Note:- $\uparrow$ (Sign) shows increment in value.

Alternatively :-

$$\text{Resultant of } a\% \text{ \& } b\% = a\% + b\% + \frac{a \times b}{100}\%$$

$$= 50\% - 20\% - \frac{50 \times 20}{100}\% = +20\%$$

131. (d) Since we don't have sufficient data. Further any value is possible as the required income tax.



Only option (d) satisfies the relation with the given condition.

133. (d) Let the rate of income tax be $r\%$

Then tax paid by me before

$$= 10,000 \times \frac{r}{100} = 100r$$

$$\text{And Tax paid now} = \frac{16000}{100} \times \frac{5}{8} \times r = 100r$$

Now, for further calculation we don't have data so option (d) is correct.

134. (b) According to the question,

Let total no. of students = 100

Boys : Girls

$x + 12\%$ of 100 : x

$x + 12$: x

$$x + 12 + x = 100$$

$$x = 44$$

Boys : Girls

56 : 44

14 : 11

135. (c) Total number of goods Required = x units

Per day production of goods = y units

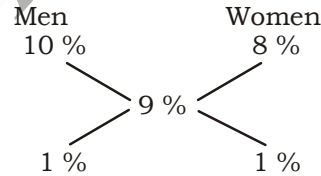
$$\text{Per day production of fit goods} = y \times \frac{(100 - z)}{100}$$

Required number of days to complete the

$$\text{order} = \frac{x}{y \times \frac{(100 - z)}{100}} = \frac{100x}{y \times (100 - z)}$$

136. (a)

By Alligation Rule



$$\therefore \text{Men : Women} = 1 : 1$$

$$\therefore \text{Number of men} = \frac{1}{2} \times 8000 = 4000$$

137 (c) By question : Let the original fraction be $\frac{a}{b}$

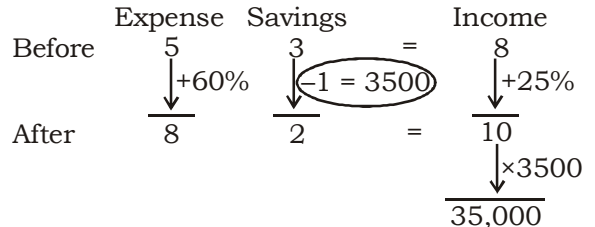
$$\frac{a^2 \times \frac{5}{4}}{b^2 \times \frac{4}{5}} = \frac{5}{8} \times \frac{a}{b}$$

$$\left(\frac{a}{b}\right)^2 \times \frac{25}{16} = \frac{5}{8} \times \left(\frac{a}{b}\right)$$

$$\left(\frac{a}{b}\right) = \frac{2}{5}$$

$$a \times b = 2 \times 5 = 10$$

138. (a)



$$1 \text{ unit} = 3500$$

$$10 \text{ units} = 3500 \times 10 = \text{Rs. } 35000$$

139. (d) Let the other candidate got K votes then winning candidate got K + 314.

According to the question.

$$85\% - 41 = \begin{array}{c} K+314 \\ \uparrow \\ \text{Winning} \\ \text{Candidate} \end{array} + \begin{array}{c} K \\ \uparrow \\ \text{Other} \\ \text{Candidate} \end{array}$$

$$85\% = \begin{array}{c} K+314 \\ \uparrow \\ 45\% \end{array} + \begin{array}{c} K+41 \\ \uparrow \\ 40\% \end{array}$$

5%

$$5\% = 314 - 41 = 273$$

Then winning candidate got votes

$$= 45\% = 9 \times 273 = 2457$$

Votes got by the other candidate = 40% - 41

$$8 \times 273 - 41 = 2143$$

Alternatively:-

$$\begin{array}{c} 100x \\ \downarrow \\ 85x \\ \downarrow \\ 85x - 41 \\ \swarrow \quad \searrow \\ 45x \quad 40x - 41 \end{array}$$

$$45x - (40x - 41) = 314$$

$$45x - 40x + 41 = 314$$

$$5x = 273$$

$$x = \frac{273}{5}$$

$$\text{Winner got} = \frac{273}{5} \times 45 = 2457$$

$$\text{loser got} = \frac{273}{5} \times 40 - 41 = 2143$$

140. (d) % increase = $\frac{40,000}{4,00,000} \times 100 = 10\%$

Year	Earning	Expenditure	Savings
I	100	50	50
II	110	66	44
III	120	84	36
IV	130	104	26
		304	156

Diagram showing Earning increasing by 10% each year (100 to 110 to 120 to 130) and Expenditure increasing by 10% each year (50 to 66 to 84 to 104). Savings are calculated as Earning minus Expenditure.

$$\text{Required \%} = \frac{156}{304} \times 100 = 51 \frac{6}{19}\%$$

141. (d) Let the opponent got K votes then winner got K + 200 votes.

By the given condition:

$$80\% - 120 = K + 200 + K$$

$$80\% = \begin{array}{c} K+200 \\ \downarrow \\ 41\% \end{array} + \begin{array}{c} K+120 \\ \downarrow \\ 39\% \end{array}$$

2%

$$2\% \text{ of total votes} = 200 - 120 = 80$$

$$\text{Total votes} = 4,000$$

Votes for the losing candidate

$$= \frac{39}{100} \times 4000 - 120 = 1440$$

$$\text{Total votes casted} = \frac{4}{5} \times 4,000 = 3,200$$

$$\text{Required \%} = \frac{1440}{3200} \times 100 = 45\%$$

Alternate:-

$$\begin{array}{c} 100x \\ \downarrow -20\% \\ 80x \\ \downarrow \\ 80x - 120 \\ \swarrow \quad \searrow \\ 41x \quad 39x - 120 \end{array}$$

200

$$41x - 39x + 120 = 200$$

$$2x = 80$$

$$x = 40$$

$$\text{total votes} = 100 \times 40 = 4000$$

$$\begin{aligned} \text{loser got} &= 39x - 120 = 39 \times 40 - 120 \\ &= 1560 - 120 \\ &= 1440 \end{aligned}$$

$$\begin{aligned} \text{Casted vote} &= 80x = 80 \times 40 \\ &= 3200 \end{aligned}$$

$$\begin{aligned} \% \text{ of defeated candidate votes} &= \frac{1440}{3200} \times 100 \\ &= 45\% \end{aligned}$$

142. (d) A+B+C+D = 56 Lakh

Given, B+C+D = 460% of A

$$\Rightarrow A+B+C+D = 560\% \text{ of } A = 56 \text{ Lakh}$$

$$\Rightarrow A = 10 \text{ Lakh}$$

$$\text{Again, } A+C+D = 366.66\% \text{ of } B$$

$$A+B+C+D = 466.66\% \text{ of } B = 56 \text{ Lakh}$$

$$\Rightarrow \frac{14}{3}B = 56 \text{ Lakh}$$

$$\Rightarrow B = 12 \text{ Lakh}$$

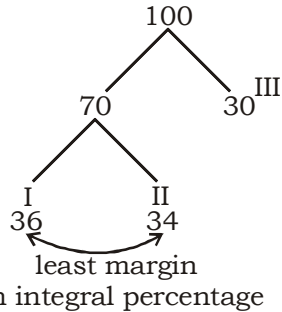
$$\text{Now, } \frac{2}{5}(A+B+D) = C$$

$$\Rightarrow (A+B+C+D) = \frac{7}{2}C = 56 \text{ Lakh}$$

$$\Rightarrow C = 16 \text{ Lakh}$$

$$\text{Hence, Amount of D} = 56 - (10 + 12 + 16) = 18 \text{ lakh.}$$

143. (c)



2 % must be an integer.

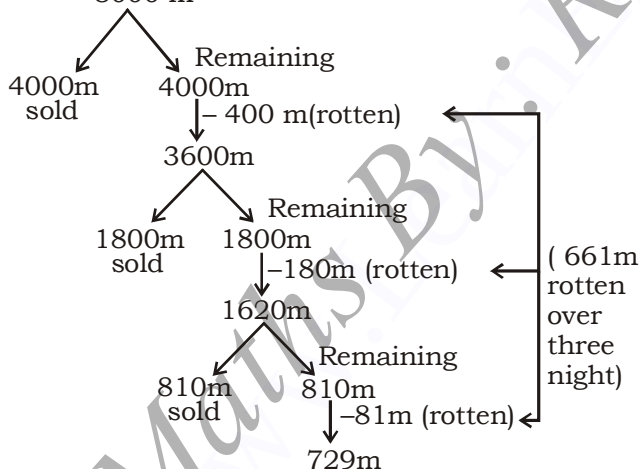
So, for minimum margin 2% = 1 (integer)

144. (b) Let us take a digit which satisfies all the frac-

tion part i.e. three times $\frac{1}{2}$ and three time $\frac{1}{10}$

So let there were 8000 (m) mangoes initially.

Then, 8000 m



$$\text{Hence } 661m = 1983$$

$$\Rightarrow m = 3$$

$$\text{Hence the total no. of mangoes} = 3 \times 8000 = 24,000$$

145. (b) Let the initial amount be P

By the given condition

$$\left(\left((P + 100) \frac{1}{2} + 100 \right) \frac{1}{2} + 100 \right) \frac{1}{2} = \frac{P}{2}$$

$$\Rightarrow P = \frac{700}{3}$$

146. (b) Here, $x = -10$ $\therefore$ equivalent reduction

$$= \left(x + y + \frac{xy}{100} \right) \%$$

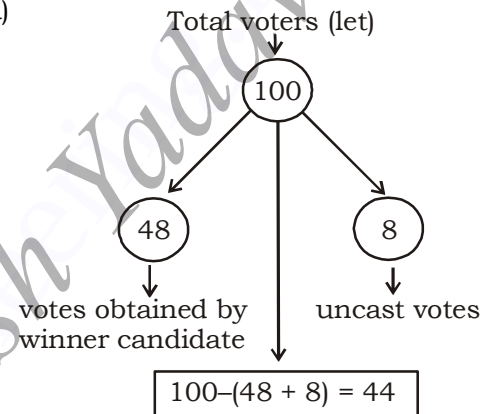
$$= \left(-10 - 10 + \frac{10 \times 10}{100} \right) \%$$

$$= (-20\% + 1\%) \%$$

$$= -19\%$$

$$= 19\% \text{ reduction}$$

147. (d)

 $\therefore$ votes obtained by looser candidate

$$\text{difference of win} = 48 - 44 = 4$$

If the difference of win be 4 votes, total voters = 100

 $\therefore$ When the difference be 1100 votes, total

$$\text{voters} = \frac{100}{4} \times 1100 = 27500$$

148. (a) Let price of wheat be w Rs/kg. then price of

$$\text{Rice (r)} = \frac{1}{5} w \text{ Rs/kg.}$$

$$\text{According to the question } 25 \times \frac{1}{5} w + 9 \times w = 350$$

$$\text{Price of wheat } w = 25 \text{ Rs/kg.}$$

$$\text{Price of rice } r = 5 \text{ Rs/kg.}$$

$$\text{New price of wheat} = \frac{6}{5} \times 25 = 30 \text{ Rs/kg.}$$

Now, Let the new quantity of rice by K kg.

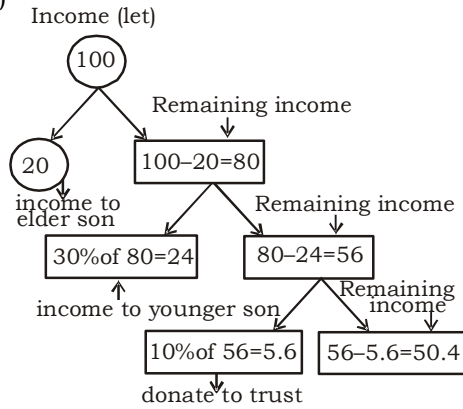
From question condition,

$$K \times 5 + 30 \times 9 = 350$$

$$K = 16 \text{ kg.}$$

$$\text{Reduction in rice} = \frac{(25 - 16)}{25} \times 100 = 36\%$$

149. (d)



$$50.4 = 10080$$

$$1 \text{ unit} = 200$$

$$\text{initial amount} = 100 \times 200 = 20000$$

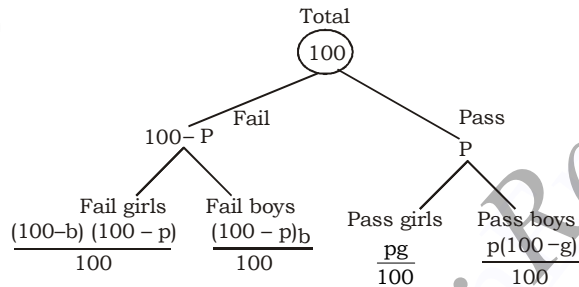
Alternate:-

$$\text{let initial income} = x$$

$$x \times \frac{80}{100} \times \frac{70}{100} \times \frac{90}{100} = 10080$$

$$x = 20000$$

150. (b)



$$\text{Required percentage} = \frac{\text{Passed Boys}}{\text{Failed Girls}} \times 100$$

$$= \frac{\frac{p(100-g)}{100}}{\frac{(100-b)(100-p)}{100}} \times 100 = \frac{100p(100-g)}{(100-b)(100-p)} \%$$

151. (c) Let total no. of voters = 100

∴ Number of polled votes = 75

and number of invalid votes = 2% of 75 = 1.5

∴ Number of valid votes = 75 - 1.5 = 73.5

∴ 75% of valid votes

$$= 75\% \text{ of } 73.5 = \frac{3}{4} \times 73.5$$

$$\frac{3}{4} \times 73.5 \approx 9261$$

$$\therefore 100 \approx \frac{9261 \times 4}{3 \times 73.5} \times 100 \approx 16800$$

i.e. total number of voters = 16800

152. (a) Let the number be $2x$ and $3x$

According to the question,

$$\left(\frac{20}{100} \times 2x\right) + 20 = \left(\frac{10}{100} \times 3x\right) + 25$$

$$\Rightarrow \frac{2x}{5} - \frac{3x}{10} = 25 - 20$$

$$\Rightarrow \frac{x}{10} = 5 \Rightarrow x = 50$$

∴ The smaller number = $2x = 100$

153. (a) According to the question,

$$\text{Pressure} \propto \frac{\text{Temperature}}{\text{Volume}}$$

$$\Rightarrow P = K \frac{T}{V} \quad (\text{where } K \text{ is a constant})$$

$$\text{New pressure } P = K \frac{\frac{7}{5}T}{\frac{5}{4}V} = \frac{7}{4} \left(K \frac{T}{V} \right)$$

$$= \frac{7}{4}(P)$$

$$\text{increase in pressure} = \frac{7}{4}p - p = \frac{3p}{4}$$

$$\% \text{ Increase in pressure} = \frac{\frac{3}{4}P}{P} \times 100 = 75\%$$

158. (a) Margin left by the typist initially = 8%

$$\text{Now margin left by him} = 8\% + 8\% \times \frac{1}{4} = 10\%$$

We also know for same type of work

$$\frac{T_1}{W_1} = \frac{T_2}{W_2} \quad [W_1, W_2 \text{ quantity of the same work}]$$

$$\frac{10 \text{ min}}{20 \times \frac{92}{100}} = \frac{T_2}{23 \times 40 \times \frac{90}{100}}$$

$$T_2 = 450 \text{ min} = \frac{450}{60} \text{ hrs} = 7 \frac{1}{2} \text{ hrs.}$$

154. (c) Let no. of wagon in the train be w .So, no. of seats in each wagon will also be w .

$$\text{Now, } 71.428\% = \frac{5}{7}$$

$$\text{Hence } \frac{5}{7} \times w = 25$$

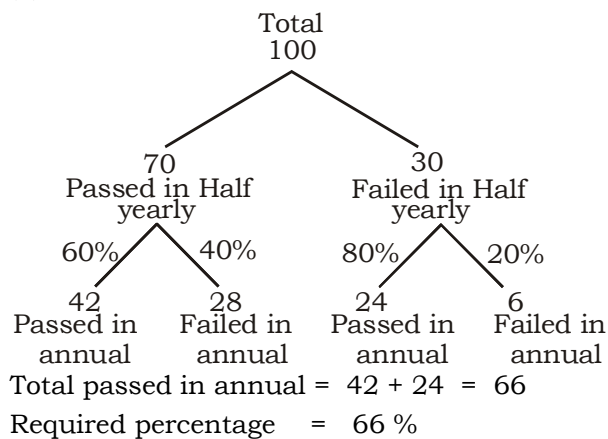
$$w = 35$$

$$\text{So total no. of seats in the train} = w \times w \\ = 35 \times 35 = 1225$$

So, Maximum no. of passengers in the train

$$= \frac{4}{5} \times 1225 = 980 \quad \left[80\% = \frac{4}{5} \right]$$

155. (c) Let the total students = 100



156. (c) Original savings = Rs (13500 - 9000)
= Rs 4500

New income = 114% of Rs. 13500
= Rs (114 × 135)
= Rs 15390

New expenditure = 107 % of Rs. 9000
= Rs (107 × 90)
= Rs 9630

∴ New savings = Rs (15390 - 9630)
= Rs 5760

∴ percentage increase in savings

$$= \frac{5760 - 4500}{4500} \times 100 \\ = \frac{1260}{45} = 28 \%$$

157. (b) Initially Employees

$$\begin{array}{l} n \\ +P\% \downarrow \text{First Month} \\ n \frac{(100+p)}{100} \\ -q\% \downarrow \text{Second Month} \\ n \frac{(100+p)}{100} \frac{(100-q)}{100} \end{array}$$

$$\text{Now } n \frac{(100+p)}{100} \frac{(100-q)}{100} = n$$

$$(100)^2 - 100q + 100p - pq = (100)^2$$

$$100(p - q) = pq$$

$$p - q = \frac{pq}{100}$$

158. (c) Let the original price of the jewellery = P
According to the question,

$$\text{Case I } P \left(\frac{x}{100} \right)^2 = 21025 \quad \dots(i)$$

Case (II) Again the final value after second cycle.

$$P \left(1 + \frac{x}{100} \right) \left(1 - \frac{x}{100} \right) \left(1 + \frac{x}{100} \right) \left(1 - \frac{x}{100} \right) = 484416 \quad (ii)$$

Dividing equation (ii) by equation (i)

$$\frac{\left[1 - \left(\frac{x}{100} \right)^2 \right]^2}{\left(\frac{x}{100} \right)^2} = \frac{484416}{21025} = \frac{2304}{100}$$

$$\frac{1 - \left(\frac{x}{100} \right)^2}{\left(\frac{x}{100} \right)} = \sqrt{\frac{2304}{100}} = \frac{48}{10}$$

after solving $x = 20\%$

$$\text{Hence } P \left(\frac{400}{100 \times 100} \right) = 21025$$

$$P = 525625$$

159. (c) Let the initial number of workers = 100

Let the required number of days = 1

$$\begin{array}{lcl} \text{Workers} \times \text{Days} & = & \text{Total work} \\ 100 \times 1 & = & 100 \text{ units} \\ \downarrow +50\% & & \downarrow +50\% \\ 150 \times 1 & = & 150 \text{ units} \end{array}$$

Required extra worker = 50

Efficiency of new worker = $\frac{5}{4}$ times as efficient as existing workers.

$$\text{Actual number of worker} = \frac{50 \times 4}{5} = 40 \text{ workers}$$

$$\text{Hence, required percentage} = \frac{40}{100} \times 100 = 40\%$$

160. (c) Let the total number of students who opted for IT = 100 units

According to the question :-

After 23 % decrease new students

$$= 100 \times \frac{23}{100}$$

$$= 23 \text{ units}$$

$$\text{Remaining students} = (100 - 23) = 77 \text{ units}$$

$$77 \text{ units} = 1540$$

$$1 \text{ unit} = \frac{1540}{77}$$

$$100 \text{ units} = \frac{1540}{77} \times 100 = 2,000$$

Alternatively :-

Original number of students

$$= \frac{1540}{(100 - 23)} \times 100 = 2,000$$

$$161. (b) 200\% = \frac{2}{1}$$

Let original height = 1 unit

New height = 3 units

Note :- Assume any value of radius = 1 unit

$$\text{Old volume} = \frac{1}{3} \pi \times 1^2 \times 1 = \frac{\pi}{3}$$

$$\text{New volume} = \frac{1}{3} \pi \times (1)^2 \times 3 = \pi$$

% increament in volume

$$= \frac{\pi - \frac{\pi}{3}}{\frac{\pi}{3}} \times 100$$

$$= \frac{2\pi}{\frac{\pi}{3}} \times 100 = 200\%$$

Alternatively :-

Note :- In such type of question always remember if height is increasing and radius is same.

Hence volume will increase same as increase in height.

Increment in height = 200%

Hence, Increment in volume = 200%

162. (c) Let the marks obtained by B = 100

According to the question,

$$\begin{array}{cccc} A & : & B & : & C & : & D \\ 90 & : & 100 & : & 80 & : & 100 \\ \text{Ratio of marks} & 9 & : & 10 & : & 8 & : & 10 \end{array}$$

$$\downarrow \times 40$$

$$360$$

$$\downarrow \times 40$$

$$[400]$$

$$\% \text{ of D's marks} = \frac{400}{500} \times 100 = 80\%$$

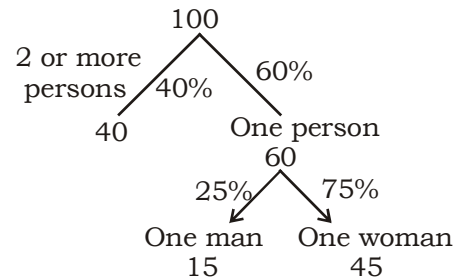
$$163. (d) 25\% = \frac{1}{4}, 30\% = \frac{3}{10}$$

	Old	New
Fee	4	5
Viewers	10	7
Total Revenue	40	35

$$\% \text{ decrease in revenue} = \frac{5}{40} \times 100 = 12\frac{1}{2}\% \downarrow$$

164. (d) Let the total houses = 100

According to the question :-



% of houses having only one woman

$$= 100 \times \frac{45}{100}$$

$$= 45\%$$

165. (a)

$$\begin{array}{ccc|ccc} \text{Chemistry} & : & \text{Mathematics} & & \text{Mathematics} & : & \text{Physics} \\ 3 & : & 5 & & 3 & : & 5 \end{array}$$

After combining the ratio,

$$\begin{array}{ccc} \text{Chemistry} & : & \text{Mathematics} & : & \text{Physics} \\ 9x & : & 15x & : & 25x \end{array}$$

According to the question,

$$9x + 15x + 25x = 147$$

$$49x = 147$$

$$x = 3$$

$$\text{Marks in chemistry} = 9 \times 3 = 27$$

166. (a) Let the income of all A + B and C = 100%
A's income : B's income : C's income : Sum

$$\frac{7 \times 100}{(100 - 80)} : \frac{6 \times 100}{(100 - 85)} : \frac{9 \times 100}{(100 - 75)} :$$

$$35x : 40x : 36x : 111x$$

According to the question,

$$111x = 333 \Rightarrow x = 3$$

$$\text{B's income} = 40 \times 3 = 120 \text{ Rs.}$$

Alternatively:-

$$80\% = \frac{4}{5}, 85\% = \frac{17}{20}, 75\% = \frac{3}{4}$$

	Salary	Savings
A	$5 \times_7$	$1 \times_7$
B	$20 \times_2$	$3 \times_2$
C	$4 \times_9$	$1 \times_9$

Note:- Make the same ratio of savings as mention in the question.

	A	B	C	Sum
Wages (salary)	35	40	36	111
	$\downarrow \times 3$		$\downarrow \times 3$	
	[120]		333	

$$\text{Wages of B} = \text{Rs. } 120$$

167. (c) Let the total number of Books = x
According to the question,

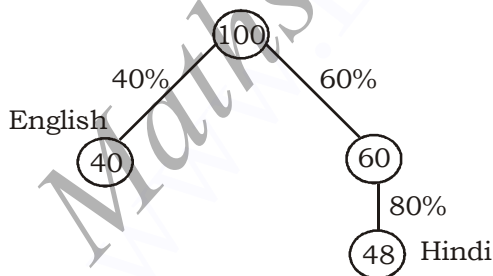
$$x \times \frac{60}{100} \times \frac{20}{100} = 300$$

$$\Rightarrow x = 2500$$

Alternatively:-

Let the total books = 100

According to the question,



$$\text{Remaining} = 100 - (40 + 48) = 12$$

$$12 \rightarrow 300$$

$$1 \rightarrow \frac{300}{12}$$

$$100 \rightarrow \frac{300}{12} \times 100 = 2500$$

$$168. (c) \text{ Number of valid votes} = 180,000 \times \frac{90}{100}$$

$$= 162000$$

$$\text{Valid votes in favour of second candidate}$$

$$= (100 - 80) \% \text{ of } 162000$$

$$= \frac{20}{100} \times 162000 = 32400$$

$$169. (c) \begin{bmatrix} 25\% = \frac{1}{4} \\ 10\% = \frac{1}{10} \end{bmatrix}$$

	Old	New
Seats $\rightarrow$	4	5
Cost $\rightarrow$	10	11
Total Revenue $\rightarrow$	40	55

$$\% \text{ increase in Total revenue} = \frac{15}{40} \times 100 = 37.5 \%$$

$$170. (d) \text{ Mutual fund } (7\%) = 2170 \text{ Rs.}$$

$$1\% = \frac{2170}{7} = \text{Rs. } 310$$

$$\text{Total monthly investment} = (7 + 18 + 6)\% = 31\%$$

$$= 31 \times 310 = 9610$$

$$\text{Total Annual investment} = 9610 \times 12 = \text{Rs. } 115320$$

171. (b) : Let x be the maximum marks
then pass marks = 28% of $x + 12$ = 30% of $x + 6$
2% of $x = 6$

$$\text{maximum marks } x = \frac{6}{2} \times 100 = 300.$$

$$\text{pass marks} = \frac{30}{100} \times 300 + 6 = 96.$$

172. (c) Let the maximum marks be x .

According to question

$$32\% \text{ of } x + 4 = 35\% \text{ of } x - 5$$

$$\Rightarrow 3\% \text{ of } x = 9 \Rightarrow x = 9 \times \frac{100}{3}$$

$$\Rightarrow \text{maximum marks } x = 300.$$

173. (d) Let I be the total income of the person.

Total expenditure of the person

$$= 18\% + 25\% + 24\% + 20\% = 87\%$$

Then Remaining sum = 13% of the income

$$13\% \text{ of income} = 19500$$

$$\text{Income} = 19500 \times \frac{100}{13}$$

$$\text{Total income } (I) = ₹ 150,000$$

174. (b) Let the initial income of the person be x
Then the sum left to the person

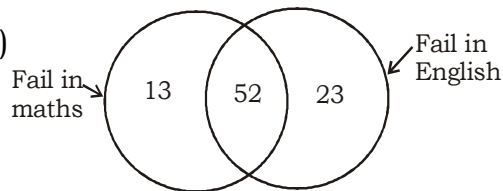
$$= x \times \left(\frac{3}{5}\right) \times \left(\frac{3}{4}\right) \times \frac{1}{2} = ₹ 2160$$

$$\Rightarrow x = ₹ 9,600$$

Alternatively: -

Initial amount	Left amount
5	3
4	3
$\frac{2}{40}$	$\frac{1}{9}$
$\times 240$	$\times 240$
<u>9600</u>	<u>2160</u>

175. (a)



(venn diagram of failed students)

Total percentage of failed students

$$= 13 + 52 + 23 = 88$$

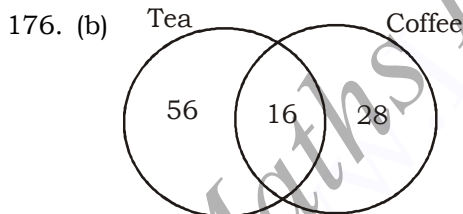
Hence percentage of passed students

$$= (100 - 88)\% = 12\%$$

According to the question,

$$\Rightarrow 12\% \text{ of the total students} = 48.$$

$$\Rightarrow \text{total number of students} = 48 \times \frac{100}{12} = 400.$$



Persons taking either tea or coffee

$$= 72 + 44 = 116\%$$

Total persons = 100%

Hence 16% of the persons take both coffee and tea.

$$16\% \rightarrow 192 \quad (\text{given})$$

$$100\% \rightarrow 192 \times \frac{100}{16} = 1200.$$

Total number of persons in the group = 1200

176. (c) Let the original fraction be $\frac{x}{y}$ then,

$$\frac{x \times 132\%}{y \times 175\%} = \frac{12}{25}$$

$$\frac{x}{y} = \frac{12}{25} \times \frac{175}{132} = \frac{7}{11}$$

177. (a) If the price is decreased means the expenditure is also decreased and the persons bought 2 kg more sugar keeping expenditure same. then we can say,

Decrease in expenditure = present price of 2 kg sugar

$$360 \times \frac{1}{5} = 2 \times x$$

Present price of sugar $x = ₹ 36$ per kg

$$\text{Original price of sugar} = \frac{100}{80} \times x = \frac{5}{4} \times 36$$

$$= ₹ 45 \text{ per kg}$$

Alternatively:-

	Original		Present	
Price	$5x$	-20%	$4x$	$\left[\frac{\therefore \text{Quantity Expenditure}}{\text{cost}} \right]$
Expenditure	$\frac{360}{5x}$		$\frac{360}{4x}$	
Quantity	$\frac{360}{5x}$		$\frac{360}{4x}$	

$$\text{Difference} \quad \frac{90}{x} - \frac{72}{x} = 2\text{kg}$$

$$\frac{18}{x} = 2 \Rightarrow x = 9$$

Hence the original price of sugar = $5 \times 9 = 45$ per kg
and the present price of the sugar

$$= 4 \times 9 = 36 \text{ per kg}$$

Alternative:-

(b) while solving such question we can take help from options and for another method see the earlier examples of same types.

178. (b) Let x be the maximum marks in the exam

According to the question,

$$x \times 32.2\% + 28 = x \times 45\% - 36$$

$$12.8\% \times x = 64$$

$$\text{maximum marks } x = \frac{100}{12.8} \times 64 = 500$$

$$\text{Minimum pass marks} = 45\% \text{ of } 500 - 36$$

$$= 225 - 36 = 189$$

$$\text{Required passing percentage} = \frac{189}{500} \times 100 = 37.8\%$$

Alternate:-

$$\begin{array}{r} 32.2\% \\ 45\% \\ \hline -28 \\ +36 \end{array}$$

$$\text{Difference } 12.8\% = 64 \text{ marks}$$

$$1\% = \frac{64}{12.8} = 5 \text{ marks}$$

$$\begin{aligned} \text{Passing percentage} &= 32.2 + \frac{28}{5} = 32.2 + 5.6 \\ &= 37.8\% \end{aligned}$$

$$\begin{aligned} 179. (c) \text{ Total failed students} &= \frac{3}{5} \times 900 + \frac{1}{2} \times 1100 \\ &= 540 + 550 = 1090 \end{aligned}$$

$$\text{Required percentage} = \frac{1090}{2000} \times 100 = 54.5\%$$

$$\begin{aligned} 180. (c) \text{ Let his initial salary be Rs. } x \\ \text{His initial spending on son's education} \end{aligned}$$

$$20\% \text{ of } x = 645 - \frac{170}{2}$$

$$\frac{1}{5} x = 645 - 85$$

$$\frac{1}{5} x = 560$$

$$x = ₹ 2800$$

$$\begin{aligned} 181. (c) \text{ Total maximum marks in four subjects} \\ = 120 + 140 + 100 + 180 = 540 \end{aligned}$$

$$60\% \text{ of total maximum marks} = \frac{3}{5} \times 540 = 324$$

$$\text{Marks obtained in three subjects}$$

$$= 120 \times \frac{2}{5} + 140 \times \frac{11}{20} + 100 \times \frac{9}{20}$$

$$= 48 + 77 + 45$$

$$= 170$$

$$\begin{aligned} \text{Marks to be obtained in maths} &= 324 - 170 \\ &= 154 \end{aligned}$$

$$\begin{aligned} 182. (b) \text{ Number of passengers after getting down and} \\ \text{getting in at the first station} &= 240 - 12 + 22 \\ &= 250 \end{aligned}$$

$$\text{Passengers left in the train after the second}$$

$$\text{station} = 250 - \frac{1}{5} \times 250 = 200$$

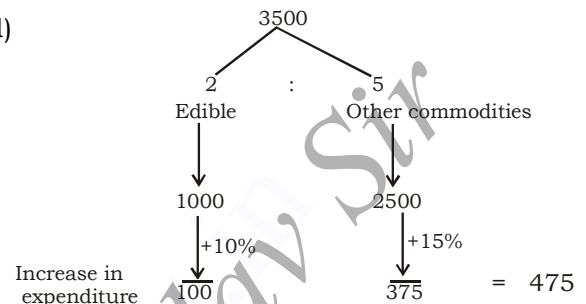
Let x people get down at the third station then
According to the question,

$$200 + 32 - x = 240 \times \frac{80}{100}$$

$$232 - x = 192$$

$$x = 40$$

182. (d)



Hence total expenditure increased = 475
so his salary must be increased by 475 rupees.
so that he may consume the same quantity as before.

183. (b) A's single equivalent discount

$$= \left(25 + 15 - \frac{25 \times 15}{100} \right) \% = (40 - 3.75)$$

$$= 36.25\%$$

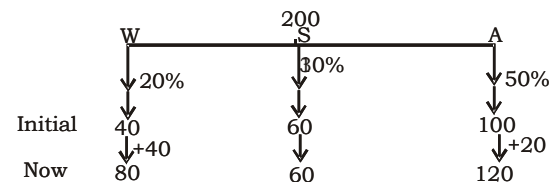
B's single equivalent discount

$$= \left(10 + 30 - \frac{10 \times 30}{100} \right) = (40 - 3) = 37\%$$

B's discount = 37%

Hence B's scheme is the best for customer.

184. (a) Water Spirit Alcohol



$$\begin{aligned} \text{New ratio} &\Rightarrow W : S : A \\ &= 80 : 60 : 120 \\ &\Rightarrow 4 : 3 : 6 \end{aligned}$$

185. (c) Let the total valid votes be 100%

$$\begin{aligned} \text{Then second candidate got} &= (100 - 52 - 12)\% \\ &= 36\% \end{aligned}$$

According to the question,

$$\Rightarrow 36\% = 28800$$

$$\Rightarrow 100\% = 28800 \times \frac{100}{36} = 800,00$$

Hence total valid votes = 80,000

$$\Rightarrow \text{Total votes polled} = 80,000 + 10,000$$

$$90\% = 90,000$$

$$\Rightarrow \text{Total number of votes} = \frac{10}{9} \times 90,000$$

$$100\% = 1,00,000$$

186. (a) The candidate at second place get

$$= (100 - (55 + 5))$$

$$= 40\% \text{ votes}$$

Difference between winning and second candidate

$$= (55 - 40) = 15\%$$

According to the question,

$$\text{But } 15\% \rightarrow 9000$$

According to the question,

$$100\% \rightarrow \frac{100}{15} \times 9000 = 60,000$$

187. (b) Percentage change in area

$$= 40 - 40 - \frac{40 \times 40}{100} = -16\%$$

Hence there is a decrease of 16% in the area

Alternative :

$$40\% = \frac{2}{5}$$

	Initial	Final
Base	5	7
Height	5	3
Area	25	21

$$\boxed{\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}}$$

Note:- leave $\frac{1}{2}$ because it is a constant term. So it will be same in both cases.

$$\text{percentage decrease} = \frac{25 - 21}{25} \times 100 = 16\%$$

Note:- For same value of successive increase/decrease.

$$\text{Always reduction} = \frac{x^2}{100} = \frac{(40)^2}{100} = 16\%$$

188. (b) Let the total sell during the month be x

Commission got by the students

$$= 18325 - 2700 = \text{Rs. } 15625$$

$$\Rightarrow 6\frac{1}{4}\% \text{ of } x = 15625$$

$$x = 16 \times 15625$$

$$x = 2,50,000$$

189. (c) Minimum pass marks = 50%

$$50\% \longrightarrow = 163 + 37$$

$$50\% \longrightarrow = 200$$

Maximum marks in exam. $100\% \longrightarrow 400$

190. (d) L B H Volume

$$\text{Initial } 1 : 2 : 3 = 6$$

$$\text{Now } 2 : 6 : 9 = 6 \times 18$$

Hence, the volume will be 18 times of the old volume.

191. (d) We can solve this type of question by the help of options to save our valuable time. taking option (d)

Total Students 265			
Initial	Girls 140	Boys 125	Difference = 15
Now	154 (+10%)	145 (+16%)	= 9

It satisfy the question condition so option (c) is correct.

192. (c) Let number of brown pairs be x

	Black	Brown
No. of pairs	4	x
Price of pair	2	1
Expenditure	8	x

$$\text{Initial expenditure} = 8 + x$$

$$\begin{aligned} \text{But the new expenditure} &= 4 \times 1 + 2 \times x \\ &= (4 + 2x) \end{aligned}$$

According to the question,

$$(4 + 2x) = \frac{3}{2}(8 + x)$$

$$8 + 4x = 24 + 3x$$

$$x = 16$$

Hence the required ratio of socks = $4 : 16 = 1 : 4$

193. (a) Per copy of magazine for the customer of 51

$$\text{magazine} = \frac{7}{10} \times 90 = \text{Rs. } 63$$

Per copy price of magazine for the customer of 26

$$\text{magazine.} = \frac{3}{4} \times 90 = \text{Rs. } 67.50$$

$$\text{Difference} = 67.50 - 63 = \text{Rs. } 4.50$$

Alternate:-

Difference between two price = $(30 - 25)\%$ of 90
 = 5% of 90 = Rs. 4.5

194. (c) Let the total sales be of x rupees
 total sales $\longrightarrow 10,000 + (x - 10,000)$

$\downarrow 10\%$ $\downarrow 12.5\%$
 earning of salesman 10,00 + 1875
 12.5% of $(x - 10,000) = 1875$

$$\frac{1}{8} \times (x - 10,000) = 1875$$

$$(x - 10,000) = 15,000$$

$$x = \text{Rs. } 25,000$$

195. (a) decrease in the area of the rectangle

$$= -20 + 10 - \frac{20 \times 10}{100}$$

$$= -12\%$$

Hence the area of rectangle will reduce by 12%
 And the new area of the rectangle

$$= \frac{88}{100} \times 200 = 176 \text{ cm}^2$$

Alternate:-

	Old		New
Length	5	$\times$	4
Breadth	10	$\times$	11
Area	50		44
	$\downarrow \times 4$		$\downarrow \times 4$
	200		176

196. (a) According to the question,

$$1C - 1T = 400$$

....(i)

Also, given

$$6C + 6T = 4800$$

$$1C + 1T = 800$$

....(ii)

Solving (i) and (ii) we get

Price of chair = 600

Price of table = 200

$$\text{Required percentage} = \frac{600 - 200}{600} \times 100$$

$$= \frac{400}{6} \% = \frac{200}{3} \%$$

197. (c) Total number of females = $2,40,000 - 1,32,000$
 = 1,08,000

Total number of literates

$$= \frac{64}{100} \times 2,40,000 = 1,53,600$$

Number of literate males

$$= \frac{9}{10} \times 1,32,000 = 1,18,800$$

Number of literate females

$$= 1,53,600 - 1,18,800 = 34,800$$

Required percentage

$$= \frac{34,800}{108000} \times 100 = 32\frac{2}{9} \%$$

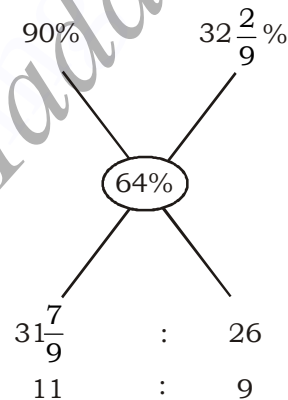
Alternate :-

Total number of female = 108,000

Ratio of male and female = 132,000 : 108,000

Male : Female = 11 : 9

Now by alligation method,



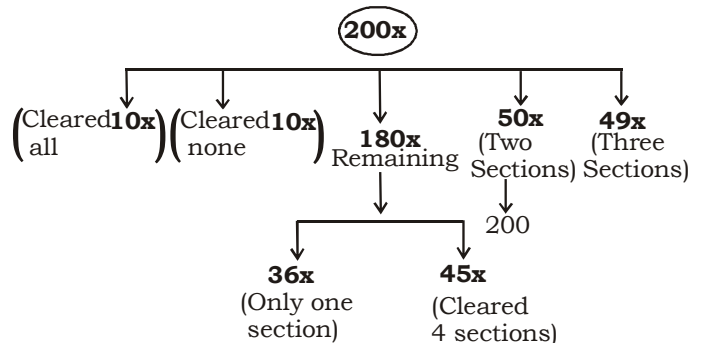
$$\frac{90 \times 11 + x \times 9}{11 + 9} = 64$$

$$990 + 9x = 64 \times 20$$

$$x = \frac{290}{9}$$

$$x = 32\frac{2}{9} \%$$

198. (c) Let the total students be $200x$ then



The Number of students who attempted only two questions = $200x - 150x = 50x$

$$50x = 200$$

$$x = 4$$

Hence the total no. of students = $200 \times 4 = 800$

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199. (b) Let the monthly rent be x rupees.

Then the annual rent = $12x$

According to the question,

$$[12.5\% = \frac{1}{8}]$$

$$\frac{7}{8} \times (12x) - 325 = \frac{5.5}{100} \times 1,00,000$$

$$\frac{7}{8} \times 12x - 325 = 5500$$

$$\frac{7 \times 3}{2} x = 5500 + 325$$

$$x = \frac{5825 \times 2}{21}$$

$$x = 554.76$$

200. (b) $20\% = \frac{1}{5}$, $10\% = \frac{1}{10}$

	Initial	Left
House rent	10	9
Food	5	4
Income tax	5	4
Clothes	10	9
	2500	1296
	$\downarrow \times 12$	$\downarrow \times 12$
	Rs. 30,000	Rs. 15,552

Alternatively:-

$$x \times \left(\frac{9}{10} \times \frac{4}{5} \times \frac{4}{5} \times \frac{9}{10} \right) = 15,552$$

$$x = \frac{2500}{1296} \times 15552 = \text{Rs. } 30,000$$

201. (c) Let per month rent of the house be Rs. x

Then, per year rent = $12x$

Now, by question,

$$\frac{7}{8} \times (12x) - 1660 = 10\% \text{ of } 5 \text{ lakh.}$$

$$\frac{7}{8} \times (12x) - 1660 = 50,000$$

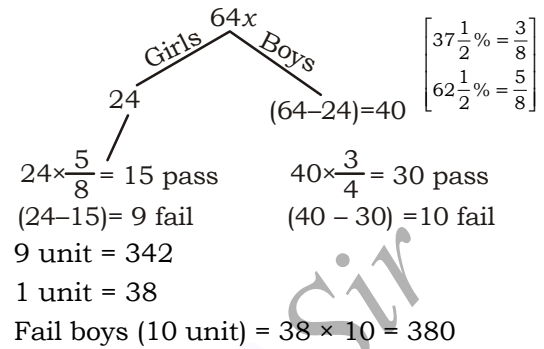
$$\frac{7 \times 3}{2} x = 51660$$

$$x = \text{Rs. } 4920$$

202. (d) While solving this type of questions take the total number of student in such a way so that we may deal with all the fraction easily and also

make our calculation easier.

Lets take the total number student = $64x$



We know $9x = 342$

$$x = 38$$

Hence number of failed boys $10x = 380$

203. (b) Initial Present

100	103
40	41
20	21
80,000	88683

$\downarrow \times 2$	$\downarrow \times 2$
1,60,000	1,77,366

Hence, Present population = 1,77,366

204. (b) Initial Present

20	19
10	11
25	28
5,000	5852

$\downarrow \times 20$	$\downarrow \times 20$
1,00,000	1,17,040

Hence the profit = $1,17,040 - 1,00,000$
= Rs. 17040

205. (a) Let total valid votes = 100%

Then,

$$54\% - 46\% = 1620$$

$$8\% = 1620$$

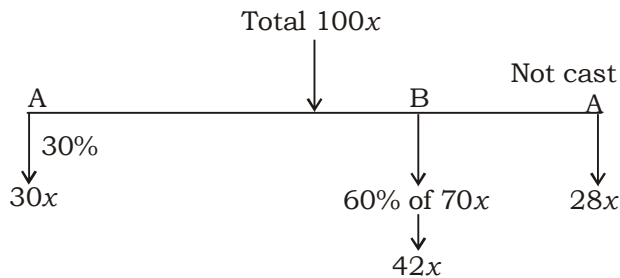
$$100\% = \frac{100}{8} \times 1620 = 20250$$

According to the question,

Now, the total number of voters

$$= \frac{10}{9} \times \frac{10}{9} \times 20250 = 25,000$$

206. (c) Let total number of Voters = $100x$



Difference of the number of voters who vote for A and who did not cast their vote = $30x - 28x = 2x$

According to the question,

$$2x = 1200$$

$$x = 600$$

Hence total number of voters = $100 \times 600 = 60,000$

207. (c) Total amount in the bag

$$= \left(\frac{1}{4} \times 600 + \frac{1}{2} \times 1200 \right) \text{Rs.}$$

$$= (150 + 600) = 750 \text{ rupees}$$

The Amount taken out

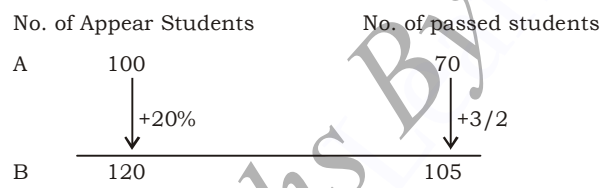
$$= \frac{1}{4} \times \left(\frac{12}{100} \times 600 \right) + \frac{1}{2} \times \left(\frac{24 \times 1200}{100} \right)$$

$$= \left(\frac{1}{4} \times 72 + \frac{1}{2} \times 288 \right) \text{ rupees}$$

$$= 18 + 144 = \text{Rs. } 162$$

$$\text{Required percentage} = \frac{162}{750} \times 100 = 21.6\%$$

208. (d)



$$\text{Required \%} = \frac{105}{120} \times 100 = 87.5\%$$

209. (d) Let Screw made by the first worker = x

Screw made by the second worker = 1500

$$50\% \text{ of } 1500 = 750$$

According to the question,

$$\frac{1}{3}x = 750$$

$$\Rightarrow x = 2250$$

$$\left[\therefore 33\frac{1}{3}\% = \frac{1}{3} \right]$$

$$210. (a) 10\% = \frac{1}{10},$$

	Initial value	New value
1 st year	10	9
2 nd year	10	9
	100	81
	$\times 100$	$\times 100$
	10,000	8100

Hence, Initial value = Rs. 10000

Alternatively:-

$$P^1 = P \left(1 \pm \frac{R}{100} \right)^{\pm n}$$

$$P^1 = 8100 \left(1 - \frac{10}{100} \right)^{-2}$$

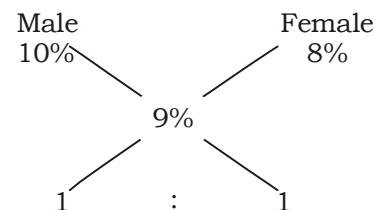
$$P^1 = \text{Rs. } 10,000$$

$$211. (c) 2\frac{1}{2}\% = \frac{1}{40}$$

Initial value	New value
40	41
40	41
40	41
64000	: 68921

Hence the population of the town after 3 years = 68921

212. (a) By Alligation method,



Ratio of male to female = 1:1

$$\text{Number of males} = \frac{1}{2} \times 8,000 = 4,000$$

213. (d) According to the question,

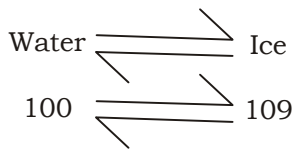
$$12\% - 10\% = \text{Rs. } 35$$

$$2\% \longrightarrow 35$$

$$100\% \longrightarrow 50 \times 35 = \text{Rs } 1750$$

Hence, Marked price of cooler = Rs 1750

214. (d) Let initial volume = 100



When the ice is melted the percentage decrease in its volumes

$$= \frac{109 - 100}{109} \times 100 = \frac{900}{109} = 8\frac{28}{109}\%$$

215. (b) Let the pocket money be P rupees.
then

$$P \times \left(\frac{4}{5} \times \frac{3}{4} \times \frac{9}{10} \right) = 13.50$$

$$P = \text{Rs. } 25$$

Alternatively:-

$$20\% = \frac{1}{5}, 25\% = \frac{1}{4}, 10\% = \frac{1}{10}$$

Initial	Left
5	4
4	3
10	9
200	4 \times 27
50	27
\downarrow \times 1/2	\downarrow \times 1/2
25	13.50

216. (b) According to the question,

$$\frac{5}{100} \times R = \frac{15}{100} M$$

$$\Rightarrow \frac{R}{M} = \frac{3}{1}$$

$$\frac{10}{100} \times M = \frac{20}{100} \times K$$

$$\frac{M}{K} = \frac{2}{1}$$

$$R : M : K$$

$$3 : 1 : 1$$

$$6 : 2 : 1$$

$$\downarrow \times 2000 \quad \downarrow \times 2000$$

$$12000 \quad 2000$$

Hence Rakesh income = Rs. 12000

$$217. (b) 10\% = \frac{1}{10}$$

$$\text{Cost price} : \text{Selling price}$$

$$10 : 9$$

According to the question,

$$\frac{3}{4} \text{ of previous selling price} = 9$$

$$\text{previous selling price} = 12$$

$$\text{Profit percentage} = \frac{(12 - 10)}{10} \times 100 = 20\%$$

$$218. (c) 2 \text{ metric tonnes} = 2 \times 1000 \text{ kg}$$

$$30 \text{ quintal} = 30 \times 100 \text{ kg}$$

$$\text{Required percentage} = \frac{30 \times 100}{2 \times 1000} \times 100 = 150\%$$

$$219. (c) \text{ difference in cost price} = \left(3\frac{1}{2} - 3\frac{1}{3} \right) \% \text{ of } 8400$$

$$= \frac{1}{6} \% \text{ of } 8400$$

$$\frac{1}{6} \% \times 8400 = \frac{1}{6} \times \frac{1}{100} \times 8400 = \text{Rs. } 14$$

Hence the required difference = Rs 14.

$$220. (b) \text{ Required error percentage} = \frac{45^{\circ} 27' - 45^{\circ}}{45^{\circ}} \times 100$$

$$= \frac{27'}{45^{\circ}} \times 100 = \frac{27}{60 \times 45} \times 100 = 1\%$$

221. (b) Given that,

Birth rate, = 32 per thousand

Death rate = 11 per thousand

Net increase in population = (32 - 11) per thousand = 21 per thousand

Hence required percentage

$$= \frac{21}{1000} \times 100 = 2.1\%$$

222. (b) Single equivalent discount given by first shopkeeper

$$= \left(15 + 10 - \frac{15 \times 10}{100} \right) \% = (25 - 1.5) \% = 23.50\%$$

Single equivalent discount given by second shopkeeper

$$= \left(9 + 16 - \frac{9 \times 16}{100} \right) \% = (25 - 1.44) = 23.56\%$$

Hence, it will be more beneficial for the customer to purchase the commodity from the second shopkeeper.

223. (b) Let Bhuvnesh' total initial income be $800x$ then

	Income	Expenditure	Saving	
Initial	$800x$	$-$	$500x$	$= 300x$
	$\downarrow + 12\%$	$\downarrow + 15\%$	$\rightarrow + 21x$	
Later	$896x$	$-$	$575x$	$\rightarrow 321x$
Hence percentage increase in his saving				
$= \frac{321x - 300x}{300x} \times 100 = \frac{21x}{300x} \times 100 = 7\%$				

Alternate :-

Note:- We can solve this questions by alligation method to save your valuable time.

Expenditure	:	Saving
15%		$x\%$
	12%	
5	:	3

$$\frac{15 \times 5 + 3 \times x}{5 + 3} = 12 \Rightarrow 96 = 75 + 3x$$

$$\Rightarrow 3x = 21 \Rightarrow x = 7\%$$

percentage increment in Savings = 7%

224. (d) Let the initial price of one mango = x rupees

then the price after increment = $\frac{6}{5}x$ rupee

Now according to the question,

$$\frac{40}{x} - \frac{40}{\left(\frac{6}{5}x\right)} = 4$$

$$\frac{40}{x} - \frac{40}{x} \times \frac{5}{6} = 4$$

$$\frac{40}{x} \left(1 - \frac{5}{6}\right) = 4$$

$$\frac{40}{x} \times \frac{1}{6} = 4$$

$$x = \frac{10}{6} = \text{Rs. } \frac{5}{3}$$

So, price of one mango before increment

$$= \text{Rs. } \frac{5}{3}$$

Hence price of 15 mangoes before increment

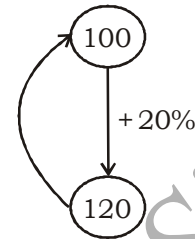
$$= 15 \times \frac{5}{3} = \text{Rs. } 25$$

Alternatively:-

Note :- To save your valuable time you can follow the below given method.

Let the initial expenditure = 100

According to the question,

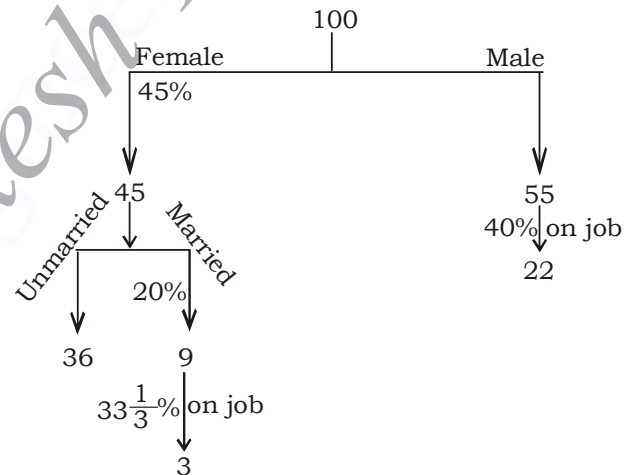


$$\text{Reduction} = \frac{20}{120} = \frac{1}{6} = \frac{5 \rightarrow \text{New value}}{6 \rightarrow \text{Old value}}$$

$$\text{Required price} = \frac{40}{24} \times 15 = \text{Rs. } 25$$

239. (b) Let total population = 100

According to the question,



Total person on job = $3 + 22 = 25$

Percentage of the unemployed population

$$= \frac{100 - 25}{100} \times 100 = 75\%$$

Alternatively:-

Let the total population be 100

Then by question

$$\text{No. of working women} = 100 \times \left(\frac{45}{100}\right) \times \left(\frac{20}{100}\right) \times \left(\frac{1}{3}\right) = 3$$

$$\text{No. of working men} = 100 \times \left(\frac{55}{100}\right) \times \left(\frac{40}{100}\right) = 22$$

$$\text{Required \%} = \frac{[100 - (22 + 3)]}{100} \times 100 = 75\%$$

225. (d) Let the income of the person be x rupees then

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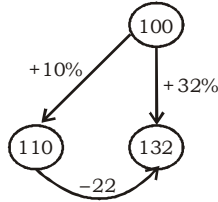
According to the question,
Amount saved by elder son

$$20 = x \times \left(\frac{1}{100}\right) \times \left(\frac{4}{5}\right) \times \left(\frac{1}{5}\right)$$

$$20 = x \times \frac{1}{625}$$

$$x = \text{Rs. } 12,500$$

226. (a) Let the initial expenditure of the family = 100 Rs.



$$\text{Reduction} = \frac{22}{132} = \frac{1}{6} = \frac{5}{6} \rightarrow \text{New}$$

According to the question,

$$6 \text{ units} = 30 \text{ kg}$$

$$1 \text{ units} = \frac{30}{6} \text{ kg}$$

$$5 \text{ units} = \frac{30}{6} \times 5 = 25 \text{ kg}$$

New consumption = 25 kg

227. (a) Given that,

There is a increase per 1000 = 75

⇒ There is a increase of 7.5% per annum

$$\left[\because \frac{75}{1000} \times 100 = 7.5\% \right]$$

$$\text{We know } 7.5\% = \frac{15}{2}\% = \frac{3}{40}$$

So, population of the city after two years

$$= 4.2 \times 10^6 \times \left(\frac{43}{40}\right) \times \left(\frac{43}{40}\right)$$

$$= 42,00,000 \times \left(\frac{43}{40}\right) \times \left(\frac{43}{40}\right) = 48,53,625$$

228. (c) Let the amount invested at the rate of 6% = x

According to the question,

$$(10000 - x) \times \frac{5}{100} - \frac{x \times 6}{100} = 76.50$$

$$\Rightarrow 500 - \frac{5x}{100} - \frac{6x}{100} = 76.50$$

$$\Rightarrow \frac{11x}{100} = 423.50$$

$$x = \text{Rs. } 3850$$

Hence the amount invested at 6% = Rs. 3850

Alternate:-

Note:- In such of type of questions we can take help from options to save our valuable time.

Option (c) part invested on 6% = 3850

$$\begin{aligned} \text{part invested on } 5\% &= (10000 - 3850) \\ &= 6150 \end{aligned}$$

According to the question,

$$\frac{6150 \times 5}{100} - \frac{3850 \times 6}{100} = 76.50$$

The difference is same as mentioned in question so option (c) is correct.

$$229. (d) 25\% = \frac{1}{4}$$

According to the question,

	Initial	Later
No. of employees	4	5
Salary	4	3
Total wages	16	15

-1

$$\text{Hence required percentage} = \frac{1}{16} \times 100 = 6\frac{1}{4}\%$$

$$\text{So, value of } x = 6\frac{1}{4} = \frac{25}{4}$$

Alternate:-

$$\text{Value of } x = \left(25 - 25 - \frac{25 \times 25}{100} \right)$$

$$x = -\frac{25}{4}$$

Here, (-ve) sign show decrease in wages.

$$230. (b) \text{ Money spent by the man} = \left(5 + 5 - \frac{5 \times 5}{100} \right)\%$$

$$= 9\frac{3}{4}\%$$

$$\text{Remaining money} = 90\frac{1}{4}\%$$

Now according to the question,

$$90\frac{1}{4}\% = 90\% + 20$$

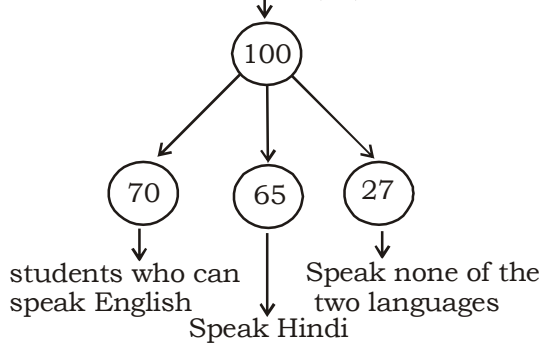
$$\Rightarrow \frac{1}{4}\% = 20$$

$$\Rightarrow 1\% = 80$$

$$\Rightarrow 100\% = ₹ 8,000$$

Hence the income of the man = ₹ 8,000

231. (b) Total students (let)

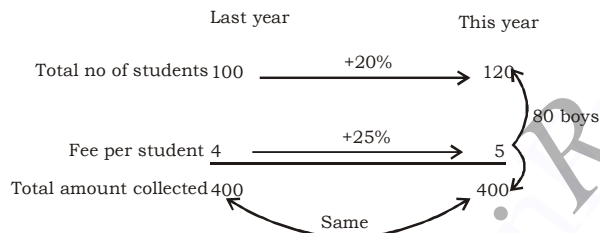


∴ 27 students speak none of the two languages.

i.e. Only 73 students speak either Hindi or English or both = $70 + 65 = 135$

∴ Total no. of students who speak both the languages = $135 - 73 = 62\%$

232. (a) In the last year all the students (Boys + Girls) paid the fee. but this year only boys paid fee.
now



$$\text{Hence the number of boys} = \frac{400}{5} = 80$$

$$\text{and the number of girls} = 120 - 80 = 40$$

$$\text{So, the required ratio} = 80 : 40 = 2 : 1$$

Alternatively:-

$$(G + B) = B \times \frac{120}{100} \times \frac{125}{100}$$

$$G + B = \frac{3}{2}B$$

$$\frac{B}{G} = \frac{2}{1} = 2 : 1$$

$$233. (b) 20\% = \frac{1}{5}, 25\% = \frac{1}{4}$$

Man	: Women	: child
5	: 4	
	5	: 4
25x	: 20x	: 16x

Total amount received by all

$$= 8 \times (25x) + 10 \times (20x) + 12 \times (16x)$$

$$6100 = 200x + 200x + 192x$$

$$\Rightarrow 592x = 6100$$

$$\Rightarrow x = \frac{6100}{592}$$

Hence amount received a woman = $20x$

$$= 20 \times \frac{6100}{592} = ₹ 206.08$$

234. (a) According to the question,

	Before	Now
Price of ticket	5	4
No of visitors	20	36
Amount collected	100	144

$$\text{Initial visitors} = \frac{100}{5} = 20,$$

$$\text{New visitors} = \frac{144}{4} = 36$$

Hence the increase in the number of visitors

$$= \frac{36 - 20}{20} \times 100 = 80\%$$

$$235. (a) 20\% = \frac{1}{5}, 10\% = \frac{1}{10}$$

According to the question,

	Old	New
Length	10	11
Breadth	5	4
Area	50	44

$$\text{Hence the required percentage} = \frac{44}{50} \times 100 = 88\%$$

236. (d) Let after n years the price of both (The house and the land) would become same.

Then according to question,

$$133100 \times \left(\frac{9}{10}\right)^n = 72900 \times \left(\frac{11}{10}\right)^n$$

$$\Rightarrow \left(\frac{9}{10}\right)^n \times \left(\frac{10}{11}\right)^n = \frac{72900}{133100}$$

$$\Rightarrow \left(\frac{9}{11}\right)^n = \frac{729}{1331}$$

$$\Rightarrow \left(\frac{9}{11}\right)^n = \left(\frac{9}{11}\right)^3$$

On comparison of both sides,

$$\Rightarrow n = 3 \text{ years}$$

237. (c) Let the amount initially Rakesh Yadav has = Rs. x

According to the question,

$$\left(\frac{7}{8}x - 1600\right) \times \frac{4}{5} = 960$$

$$\frac{7}{8}x - 1600 = 1200$$

$$\frac{7}{8}x = 2800$$

$$x = 3200$$

Hence the person initially has ₹ 3200

238. (c) According to the question,

$$7\% \text{ of } 36,000 = \frac{7 \times 36,000}{100} = 2520$$

$$8\% \text{ of } 20,000 = \frac{8 \times 20,000}{100} = 1600$$

$$5\% \text{ of } 10,000 = \frac{5 \times 10,000}{100} = 500$$

So, the discount amount to be given over = 6,000

$$= [2520 - (1600 + 500)] = 420$$

$$\text{Hence required percentage} = \frac{420}{6000} \times 100 = 7\%$$

239. (d) Since he does not pay any tax upto Rs. 1 lakh and pays 20% tax above it. Let the amount above 1 lakh be x rupees then,

$$20\% \text{ of } x = 3160$$

$$\frac{1}{5} \times x = 3160$$

$$x = 15800$$

$$\text{So, his annual income} = 1,00,000 + 15,800 = 1,15,800$$

$$\text{Hence the monthly income} = \frac{1,15,800}{12} = ₹ 9650$$

240. (b) Let initially the person can buy 100 kg for Rs. 100.

$$\text{Increase in price of vegetable} = 30\% \text{ of } 100 = \text{Rs. } 30$$

So now 100 kg vegetable for Rs. 130

Expenditure of man increased by 10%

$$\text{So new expenditure of man} = 100 + (10\% \text{ of } 100) = 100 + 10 = 110$$

Now, in 130 → 100 kg

$$1 \text{ Rs.} \rightarrow \frac{100}{130} \text{ kg}$$

$$\text{Rs. } 110 \rightarrow \frac{100}{130} \times 110 = \frac{1100}{13} \text{ kg.}$$

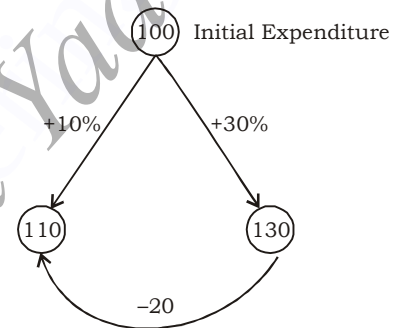
Reduction in consumption = Initial consumption

$$- \text{final consumption} = 100 - \frac{1100}{13} \text{ kg.} = \frac{200}{13} \text{ kg}$$

$$\% \text{ age reduction in consumption} = \frac{\frac{200}{13}}{100} \times 100$$

$$= \frac{200}{13} = 15\frac{5}{13}\%$$

Alternate:-



% Reduction in Consumption

$$= \frac{20}{130} \times 100 = \frac{200}{13} = 15\frac{5}{13}\%$$

241. (c) Let total income of man = 100 units

$$\text{Expenditure on clothes} = \frac{25}{100} \times 100 = 25 \text{ units}$$

$$\text{Remaining} = 100 - 25 = 75 \text{ units}$$

$$\text{Expenditure on food} = \frac{20}{100} \times 75 = 15 \text{ units}$$

$$\text{So net saving} = 75 - 15 = 60 \text{ units}$$

Given that savings = Rs. 3600

$$\text{So units } 60 \rightarrow \text{Rs. } 3600$$

$$1 \text{ unit} \rightarrow \text{Rs. } 60$$

$$100 \text{ units} = 100 \times 60 = \text{Rs. } 6,000$$

$$\text{Total salary} = \text{Rs. } 6000$$

$$\begin{aligned} \text{Expenditure on clothes} &= 25\% = \frac{25}{100} \times 6000 \\ &= \text{Rs. } 1500 \end{aligned}$$

Alternate:-

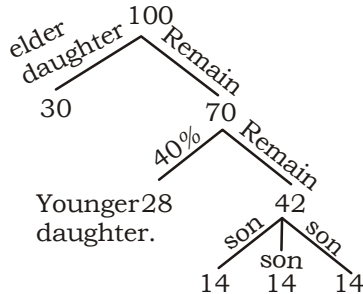
$$\begin{bmatrix} 25\% = 1/4 \\ 20\% = 1/5 \end{bmatrix}$$

Total income	:	Savings
4	:	3
5	:	4
20		12
↓ ×300		↓ ×300
6000		3600

Total income Rs. 6000

$$\text{Expenditure on clothes} = 6000 \times \frac{25}{100} = \text{Rs. 1500}$$

242. (c) Let income of Rakesh Yadav = Rs. 100



$$14 \text{ unit} = 672$$

$$1 \text{ unit} = 48$$

$$100 \text{ unit} = 4800$$

Now, elder daughter share = 1440

$$\text{Younger daughter share} = 28 \text{ unit} = 28 \times 48 = 1344$$

Alternate:-

Let income of man = Rs. 100

Share of elder daughter = Rs. 30

Remaining = Rs. 70

$$\text{Share of younger daughter} = 70 \times \frac{40}{100} = \text{Rs. 28}$$

Remaining money = 70 - 28 = Rs. 42

Now Rs. 42 is divided equally in three sons,

$$\text{share of each son} = \frac{42}{3} = \text{Rs. 14}$$

When share of each son is Rs. 14 → income is Rs. 100

$$\text{share of each son is Rs. 1} \rightarrow \text{income is Rs. } \frac{100}{14}$$

$$\text{share of each son is Rs. 672} \rightarrow \text{income is Rs. } \frac{100}{14} \times 672 = 4800$$

$$\frac{100}{14} \times 672 = 4800$$

Net income = Rs. 4800

$$\text{Elder daughter share} = 4800 \times \frac{30}{100} = \text{Rs. 1440}$$

$$\begin{aligned} \text{Younger daughter share} &= (4800 - 1440) \times \frac{40}{100} \\ &= \text{Rs. 1344} \end{aligned}$$

243. (a) Due to 20% reduction in price, man can buy 10 mangoes more

let no. of mangoes, man is buying currently = x

20% of the current quantity(x) = 10 mangoes

so, total current quantity (x) ⇒ If 20% → 10

$$1\% \rightarrow \frac{10}{20}$$

$$100\% \rightarrow \frac{10}{20} \times 100 = 50 \text{ mangoes}$$

So, current quantity = 50 mangoes

Price given = Rs. 5

$$\text{so current price of one mango} = \frac{5}{50} = \text{Rs. } \frac{1}{10}$$

But as now, man is buying 10 mangoes more.

So quantity man must be buying = 50 - 10 = 40 mangoes

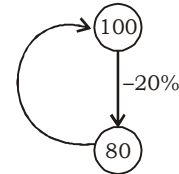
$$\text{Initial price per mango} = \frac{5}{40} = \text{Rs. } \frac{1}{8}$$

The number of mangoes bought initially in 1 rupees = 8

The number of mangoes bought currently in 1 rupees = 10

Alternate:-

Let the initial Price Rs. 100



$$\frac{20}{80} = \frac{1}{4} \Rightarrow \frac{5 \rightarrow \text{New buy Quantity}}{4 \rightarrow \text{Initial buy Quantity}}$$

$$\text{New buy quantity} = 5 \times 10 = 50$$

$$\text{Initial buy quantity} = 4 \times 10 = 40$$

$$\text{Initial price} = \frac{5}{40} = \text{Rs. } \frac{1}{8}$$

$$\text{New Price} = \frac{5}{50} = \text{Rs. } \frac{1}{10}$$

The number of mangoes bought initially in 1 rupees = 8

The number of mangoes bought currently in 1 rupees = 10

244. (a) Let total marks = 100 x

Bhuvnesh scores = 25x (failed by 60 marks)

So, pass marks = 25x + 60

.... (i)

Saurabh scores = 50x ; gets 40 marks more

So pass marks = $50x - 40$

Equation (i) & (ii)

$$25x + 60 = 50x - 40$$

$$\Rightarrow 25x = 100$$

$$\Rightarrow x = 4$$

So, total marks = 400

and pass marks = $25x + 60 \Rightarrow 25 \times 4 + 60 = 160$

So % age increased in pass marks to get full

$$\text{marks} = \frac{400 - 160}{160} \times 100 \Rightarrow \frac{240}{160} \times 100 = 150\%$$

Alternate:-

	Scores	Failed by
Bhuvnesh	25%	-60
Saurabh	50%	+40
Difference	25% $\longrightarrow$	100 marks

$$1\% = \frac{100}{25} = 4 \text{ marks}$$

Total marks (100%) = $4 \times 100 = 400$ marks

Passing marks = $100 + 60 = 160$ Marks

% increase in passing marks to get full marks

$$= \frac{(400 - 160)}{160} \times 100 = 150\%$$

$$245. (b) \text{ Per hour wages} = \frac{2400}{60} = \text{Rs. } 40$$

$$\text{Per hour wages after increase} = \frac{40}{100} (100 + 40)$$

= Rs. 56

$$\text{Work hours after reduction} = \frac{60(100 - 50/3)}{100}$$

= 50 hrs.

new weekly wages = $56 \times 50 = \text{Rs. } 2800$

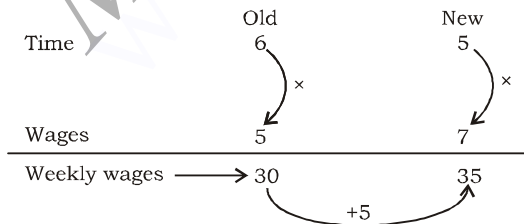
increased in wages = $2800 - 2400 = \text{Rs. } 400$

$$\% \text{ age change} = \frac{400}{2400} \times 100 = 16\frac{2}{3}\%$$

Alternate:-

$$40\% = \frac{2}{5}, \quad 16\frac{2}{3}\% = \frac{1}{6}$$

According to the question,



$$\% \text{ increase in wages} = \frac{5}{30} \times 100 = 16\frac{2}{3}\%$$

....(ii) 246. (c) Let marks of D = 100

$$\therefore \text{Marks of C} = 100 + \frac{100}{3} = \frac{400}{3}$$

$$\therefore \text{Marks of B} = \frac{400}{3} + 16\frac{2}{3}\% \text{ of } \left(\frac{400}{3}\right)$$

$$= \frac{400}{3} + \frac{200}{9} = \frac{1400}{9}$$

$$\therefore \text{marks of A} = \frac{1400}{9} \times \frac{(100 + 50)}{100} = \frac{700}{3}$$

When A gets $\frac{700}{3}$ marks, then D gets

= 100 marks

$$\text{When A gets 1 mark then D gets} = \frac{100}{700} \times 3$$

When A gets 350 marks then D gets

$$= \frac{100 \times 3 \times 350}{700} = 150 \text{ marks}$$

$$\% \text{ age of A} = \frac{150}{600} \times 100 = 25\%$$

Alternate:-

$$50\% = \frac{1}{2}, \quad 16\frac{2}{3}\% = \frac{1}{6}, \quad 33\frac{1}{3}\% = \frac{1}{3}$$

$$\text{Marks} \longrightarrow \begin{array}{ccc} A : B & B : C & C : D \\ 3 : 2 & 7 : 6 & 4 : 3 \end{array}$$

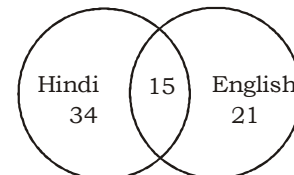
After combining the ratio,

$$\text{Marks} \longrightarrow \begin{array}{ccc} A : B : C : D \\ 21 : 14 : 12 : 9 \\ \downarrow \times 50/3 \quad \downarrow \times 50/3 \\ 350 \quad 150 \end{array}$$

$$\text{Required \% of D} = \frac{150}{600} \times 100 = 25\%$$

247. (b) By set theory :

Venn diagram of passed students



Total soldiers who do not speak any language

$$= 100 - (34 + 15 + 21) = 30\%$$

According to the question,

$$30\% = 900$$

$$1\% = \frac{900}{30}$$

$$21\% = \frac{900}{30} \times 21 = 630$$

248. (d) Let the numerator and the denominator of a fraction are x and y respectively.

$$\therefore \text{fraction} = \frac{x}{y}$$

According to the question,

$$\frac{2x \times \frac{120}{100}}{3y \times \frac{70}{100}} = \frac{16}{21} \times 24\%$$

$$\Rightarrow \frac{2x \times 12}{3y \times 7} = \frac{24}{100} \times \frac{16}{21}$$

$$\Rightarrow \frac{x}{y} = \frac{4}{25} \Rightarrow \text{Fraction} = \frac{4}{25}$$

249. (a) Direct Formula :

Final population

$$\begin{aligned} &= \text{Initial population} \left(1 + \frac{r_1}{100}\right)^{t_1} \left(1 + \frac{r_2}{100}\right)^{t_2} \\ &= 2000 \left(1 + \frac{10}{100}\right)^2 \left(1 + \frac{5}{100}\right)^3 \\ &= 2000 \times \frac{121}{100} \times \frac{9261}{8000} = 2801.45 \approx 2800 \text{ (approx.)} \end{aligned}$$

Alternate:-

Initial Population	: Final Population
10	11
10	11
20	21
20	21
20	21
8,00,000	11,20,581

According to question,

$$8,00,000 \text{ units} = 2000$$

$$1 \text{ unit} = \frac{2000}{8,00,000}$$

$$\begin{aligned} 1120581 \text{ units} &= \frac{2000}{8,00,000} \times 1120581 \\ &= 2801.45 \approx 2800 \text{ (approx)} \end{aligned}$$

250. (b) Let initial no. of visitors = 100

$$\text{initial earnings} = 12 \times 100 = 1200$$

$$\text{New no. of visitors} = 100 + 80 = 180$$

new earnings after 20% increase

$$\Rightarrow 1200 \left(\frac{120}{100}\right) = \text{Rs. } 1440$$

now (new earnings) = (new no. of visitors) $\times$ (new price of ticket)

$$\Rightarrow 1440 = 180 \times \text{price}$$

$$\Rightarrow \text{Price} = \frac{1440}{180} = \text{Rs. } 8$$

Alternate:-

Let new price of the ticket = Rs. x

$$80\% = \frac{4}{5}, \quad 20\% = \frac{1}{5}$$

Visitors $\longrightarrow$	Old 5		New 9
	$\searrow \times$		$\searrow \times$
Price $\longrightarrow$	12		x
Income $\longrightarrow$	60	:	$9x$
(Given) Income $\longrightarrow$	5	:	6
	$\searrow \times 12$		$\searrow \times 12$

$$6 \times 12 = 9x$$

$$x = 8$$

New price of the ticket = Rs. 8

251. (c) Let population of males = $100x$

$$\text{population of females} = 120000 - 100x$$

Now according to the question,

$$100x \times \frac{112}{100} + (120000 - 100x) \frac{109}{100} = 132750$$

$$\Rightarrow 112x + (1200 - x)109 = 132750$$

$$\Rightarrow 112x - 109x = 132750 - 1200 \times 109$$

$$\Rightarrow 3x = 1950 \Rightarrow x = 650$$

$$\text{No. of males} = 100x = 650 \times 100 = 65000$$

$$\text{no. of females} = 120000 - 65000 = 55000$$

$$\text{Difference} = 65000 - 55000 = 10000$$

Alternate:-

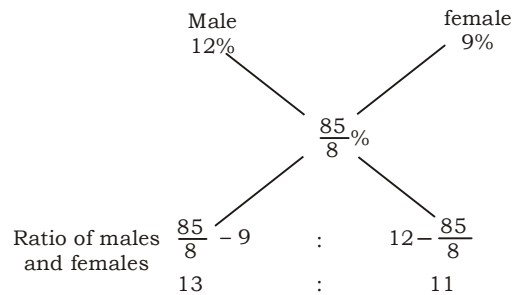
$$\text{Initial Population} = 120000$$

$$\text{Final Population} = 132750$$

$$\text{Increase in population} = (132750 - 120000) = 12750$$

$$\% \text{ increase} = \frac{12750}{120000} \times 100 = \frac{1275}{120} = \frac{85}{8} \%$$

By Alligation method,



According to the question,

Difference between males and females

$$= \frac{120,000}{(13+11)} \times (13-11) = \frac{120,000}{24} \times 2 = 10,000$$

252. (b) Total population = 8400

$$M : F = 43 : 41$$

$$\text{no. of males} = \frac{43}{84} \times 8400 \Rightarrow 4300$$

$$\text{No. of females} = \frac{41}{84} \times 8400 = 4100$$

$$\text{literate males} = \frac{80}{100} \times 4300 \Rightarrow 3440$$

$$\text{literate females} = \frac{60}{100} \times 4100 \Rightarrow 2460$$

$$\text{So literacy \% age} = \frac{\text{Total literates}}{\text{total population}} \times 100$$

$$\text{Total literates} = 3440 + 2460 = 5900$$

$$\text{literacy \% age} = \frac{5900}{8400} \times 100 \Rightarrow \frac{1475}{21} = 70 \frac{5}{21} \%$$

253. (a) Let total no. of voters = $100x$

$$\text{No. of voters that voted} = 90x$$

$$\text{Valid votes} = 90x - 2000$$

$$\text{winner gets votes} = 52\% \text{ of } 100x = 52x$$

$$\begin{aligned} \text{loser gets votes} &= (90x - 2000) - 52x \\ &= 38x - 2000 \end{aligned}$$

Now, According to the question,

$$52x - (38x - 2000) = 13200$$

$$\Rightarrow 14x = 13200 - 2000$$

$$\Rightarrow 14x = 11200 \Rightarrow x = 800$$

$$\text{no. of votes polled in favour of losing candidate}$$

$$= 38x - 2000$$

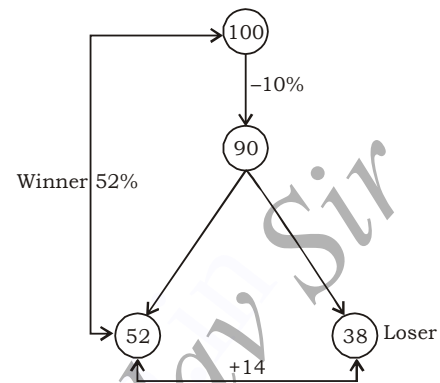
$$= 38 \times 800 - 2000$$

$$= 30400 - 2000 = 28400$$

Alternate:-

Let the total number of votes = 100 units

According to the question,



$$14 \text{ units} = (13200 - 2000) = 11200$$

$$1 \text{ unit} = \frac{11200}{14} = 800$$

Votes polled for losing candidates

$$= 800 \times 38 - 2000$$

↓ (Invalid votes)

$$= 30400 - 2000$$

$$= 28400 \text{ votes}$$

254. (a) Men : Woman : Children
9 : 8 : 3

$$\text{Let Men} = 900$$

$$\text{Women} = 800$$

$$\text{Children} = 300$$

$$\text{Total population} = (900 + 800 + 300) = 2000$$

$$\text{No. of illiterate males} = \frac{20}{100} \times 900 \Rightarrow 180$$

$$\text{No. of illiterate females} = \frac{30}{100} \times 800 \Rightarrow 240$$

$$\text{No. of illiterate children} = \frac{10}{100} \times 300 \Rightarrow 30$$

$$\text{Illiteracy \% age} = \frac{\text{No. of illiterates}}{\text{Total population}} \times 100$$

$$= \frac{(180 + 240 + 30)}{2000} \times 100$$

$$\Rightarrow \frac{450}{2000} \times 100 = 22 \frac{1}{2} \%$$

255. (b) Let total marks = 100

Pass marks = 40

$$A \text{ obtains marks} = \frac{90}{100} \times 40 = 36$$

$$\text{Now, B obtain} = 36 - 11\frac{1}{9}\% \text{ of } (36) \Rightarrow 36 - 4 = 32$$

$$C \text{ obtains} = (A + B) - 41\frac{3}{17}\% \text{ of } (A + B)$$

$$= 68 - 68 \times \frac{700}{17 \times 100}$$

$$= 68 - 28 = 40$$

So, C obtains = 40 marks

$$\% \text{ age of C} = \frac{40}{100} \times 100 = 40\%$$

Hence C passed the exam.

256. (d) Boys : Girls

$$16 : 9$$

So, let boys = $16x$

$$\text{girls} = 9x$$

$$\text{Ratio of passed} \rightarrow \text{Boys : Girls} \\ 4 : 3$$

$$\text{no. of girls passed} = \frac{75}{100} \times 9x = \frac{27x}{4}$$

$$\text{Now no. of boys passed} \rightarrow \frac{4}{3} \times \frac{27x}{4} = 9x$$

$$\% \text{ of boys passed in the exam} = \frac{9x}{16x} \times 100 = 56.25\%$$

$$\text{So total students passed} = 9x + \frac{27x}{4} = \frac{63x}{4}$$

$$\% \text{ passed students} = \frac{\frac{63x}{4}}{(16x + 9x)}$$

$$= \frac{63x}{4 \times 25x} \times 100 = 63\%$$

257. (d) Let total students appear in the exam = 100%

According to the question,

No. of student answered five questions = 5%

No. of students who did not answer any question = 5%

$$\text{Remaining} = 100 - (5 + 5) = 90\%$$

No. of students who answered only 1 question

$$= 90 \times \frac{25}{100} = 22.5\%$$

No. of students who answered only 4 questions

$$= 90 \times \frac{20}{100} = 18\%$$

No. of students who answered only 2 questions

$$= 100 \times \frac{24.5}{100} = 24.5\%$$

Total no. of students till now

$$= 5 + 5 + 22.5 + 18 + 24.5 = 75\%$$

So no. of students who answered 3 questions

$$= 100 - 75 = 25\%$$

According to the question,

25 % of total students = 200

$$\text{So total students} = \frac{200}{25} \times 100 = 800$$

258. (a) Right answer in the first condition

$$= \frac{7.5}{8.3} = 0.903$$

$$\text{Wrong answer in the second condition} = \frac{8.3}{7.5} = 1.10$$

$$\text{Difference or Error} = 1.10 - 0.903 = 0.197$$

$$\therefore \% \text{ age error} = \frac{0.197}{0.903} \times 100 = 21.8\% \text{ (approx.)}$$

259. (c) According to the question,

$$\text{Per hour wages} = \frac{1200}{50} = \text{Rs. } 24$$

$$\text{New work hours} = 50 - 50 \times \frac{8}{100} = 46 \text{ hrs.}$$

(i) Now increased per hour wages

$$= 24 + 24 \times \frac{12.5}{100}$$

$$= 24 + 24 \times \frac{1}{8} = \text{Rs. } 27$$

$$\text{New wages (total)} = 27 \times 46 = \text{Rs. } 1242$$

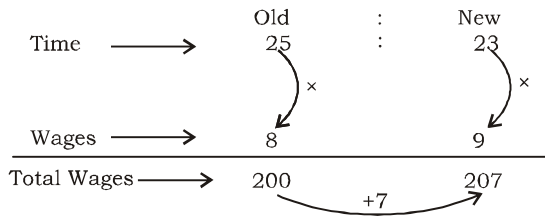
$$\text{Increased wages} = 1242 - 1200 = \text{Rs. } 42$$

(ii) % age increased in weekly wages

$$= \frac{42}{1200} \times 100 = 3.5\%$$

Alternate:-

$$12\frac{1}{2}\% = \frac{1}{8}, 8\% = \frac{2}{25}$$



$$\% \text{ Increase in total wages} = \frac{7}{200} \times 100 = 3.5\%$$

According to the question,
200 units = 1200 Rs.

$$1 \text{ unit} = \frac{1200}{200} = \text{Rs. } 6$$

$$\text{New wages} = 207 \times 6 = \text{Rs. } 1242$$

260. (d) No. of people drinking tea from group N

$$= \frac{60}{100} \times N = \frac{3}{5} N$$

No. of people drinking tea from group P = P
Now, According to the question,

$$\frac{\frac{3}{5}(N+P)}{P+N} = \frac{70}{100}$$

$$\Rightarrow \left(\frac{3}{5} N + P \right) \times 10 = 7(P + N)$$

$$\Rightarrow 6N + 10P = 7P + 7N$$

$$\Rightarrow 3P = N$$

$$\Rightarrow \frac{N}{P} = \frac{3}{1} \text{ so required \% age} = \frac{3}{1} \times 100 = 300\%$$

261. (d) Let amount deposited in bank = Rs. 100
amount invested in stocks = Rs. 150
amount invested in bonds = 100 + 25 = Rs. 125

$$\text{Income from bank} = \frac{25}{2} \% \text{ of } 100 = \text{Rs. } \frac{25}{2}$$

$$\text{Income from stocks} = \frac{25}{4} \% \text{ of } 150 = \text{Rs. } \frac{75}{8}$$

$$\text{Income from Bonds} = 5\% \text{ of } 125 = \text{Rs. } \frac{25}{4}$$

$$\text{Total income} = \frac{25}{2} + \frac{75}{8} + \frac{25}{4} = \text{Rs. } \frac{225}{8}$$

Savings from this income

$$= \frac{225}{8} \times \frac{40}{100} = \text{Rs. } \frac{45}{4}$$

when saving is Rs. $\frac{45}{4}$, then amount invested in
stocks = Rs. 150

When saving is Rs. 1, then amount invested in

$$\text{stocks} = \frac{150}{45} \times 4$$

When saving is 90,000 then amount invested in

$$\text{stocks} = \frac{150}{45} \times 4 \times 90000 = \text{Rs. } 1,20,0000$$

Alternate:-

$$150\% = \frac{3}{2}, \quad 25\% = \frac{1}{4}, \quad 12\frac{1}{2}\% = \frac{1}{8},$$

$$6\frac{1}{4}\% = \frac{1}{16}, \quad 5\% = \frac{1}{20}$$

Let total amount deposited in bank = Rs. 320

$$\therefore \text{Amount invested in stocks} = 320 \times \frac{3}{2} = \text{Rs. } 480$$

$$\text{Amount invested in Bonds} = 320 \times \frac{5}{4} = \text{Rs. } 400$$

According to the question,

$$\begin{aligned} \text{Total income} &= 320 \times \frac{1}{8} + 480 \times \frac{1}{16} + 400 \times \frac{1}{20} \\ &= \text{Rs. } 90 \end{aligned}$$

$$\text{Savings} = 90 \times \frac{(100 - 60)}{100} = \text{Rs. } 36$$

$$36 \text{ Rs.} = \text{Rs. } 90,000$$

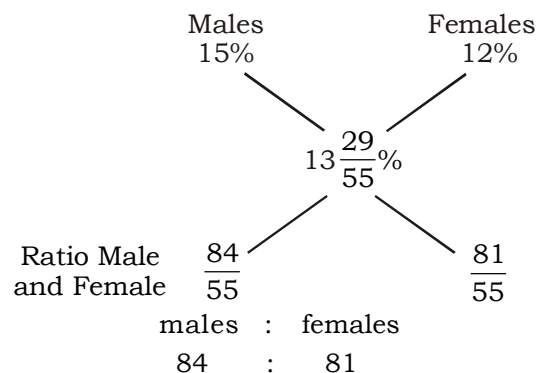
$$\text{Rs. } 1 = \text{Rs. } \frac{90,000}{36}$$

$$\begin{aligned} \text{Money invested in Stocks} &= \frac{90,000}{36} \times 480 \\ &= \text{Rs. } 1,20,0000 \end{aligned}$$

262. (d) We can do it by Alligation,

% age change in total population

$$= \frac{6244 - 5500}{5500} \times 100 = \frac{744}{5500} \times 100 = 13\frac{29}{55}\%$$



So, difference between no. of males and females

$$= \frac{5500}{165} \times (84 - 81)$$

$$= \frac{5500}{165} \times 3 = \text{Rs. } 100282. \quad (\text{b) Earnings} = \text{Price of}$$

ticket $\times$ No. of viewers.

Initially let no. of viewers = 100

Price of ticket = 20

Earnings = 2000

Now no. of viewers = 140

$$\text{Now total earnings} = 2000 + \frac{20}{100} \times 2000$$

$$= 2000 + 400 = 2400$$

so, $2400 = 140 \times \text{new price}$

$$\text{new price} = \frac{2400}{140} = \frac{120}{7} = 17\frac{1}{7}$$

$$= 20 - 17\frac{1}{7} = \text{Rs. } 2\frac{6}{7}$$

Alternatively:-

$$40\% = \frac{2}{5}, \quad 20\% = \frac{1}{5}$$

Viewers	→	Old	:	New
		5	:	7
		×		×
Price of Ticket	→	20		x
Total Revenue	→	5		6

According to the question,

$$\frac{100}{7x} = \frac{5}{6} \Rightarrow 7x = 120$$

$$\Rightarrow x = \frac{120}{7}$$

Reduction in ticket price

$$= 20 - \frac{120}{7} = \frac{20}{7} = \text{Rs. } 2\frac{6}{7}$$

263.(c) Let max. marks = $100x$

According to the question,

$$\text{Pass marks} = 33x + 72$$

$$\text{Pass marks} = 49x - 56$$

$$\Rightarrow 33x + 72 = 49x - 56$$

$$\Rightarrow 16x = 128 \Rightarrow x = 8$$

$$\text{Max. marks} = 800$$

$$\text{Pass marks} = 33x + 72$$

$$= 33 \times 8 + 72 \Rightarrow 336$$

$$\text{Pass \% age} = \frac{336}{800} \times 100 = 42\%$$

Note:- for alternate method see the earlier examples of same types.

$$264. (a) \text{ S.A} = 4\pi r^2$$

$$\text{Vol} = \frac{4}{3} \pi r^2$$

$$\text{Required \% age} = \frac{4\pi r^2}{\frac{4}{3}\pi r^3} \times 100$$

$$\Rightarrow \frac{3}{r} \times 100 \Rightarrow \frac{3}{20} \times 100 = 15\%$$

265. (a) Let the number = N



$$\text{Number (N)} = a + b + c$$

According to the question,

$$a + b = \frac{k}{100} (c) \Rightarrow N - c = \frac{kc}{100}$$

$$N = \left(1 + \frac{k}{100}\right) c \Rightarrow c = \frac{100N}{100+k}$$

266. (a) Let population after 6 years = P

$$P = 180000 \left(1 + \frac{10}{100}\right)^2 \left(1 + \frac{20}{100}\right)^3 \left(1 - \frac{2}{100}\right)^1$$

$$P = 180000 \times \left(\frac{121}{100}\right) \left(\frac{216}{125}\right) \left(\frac{49}{50}\right)$$

$$P = 368830$$

$$267. (c) \text{ Score in geography} = \frac{40}{100} \times 120 = 48$$

$$\text{Score in History} = \frac{55}{100} \times 140 = 77$$

$$\text{Score in Sanskrit} = \frac{45}{100} \times 100 = 45$$

According to the question,

Let his score in maths = x

$$x + 48 + 77 + 45 = (120 + 140 + 100 + 180) \times \frac{60}{100}$$

$$170 + x = 324$$

$$x = 324 - 170 = 154$$

$$\text{Required percentage} = \frac{154}{180} \times 100 = 85\frac{5}{9}\%$$

268. (c) Let D's salary = 100 units

According to the question,

$$\begin{array}{ccccccc} A & : & B & : & C & : & D \\ 72 & : & 90 & : & 120 & : & 100 \end{array}$$

given 15% of D = Rs. 45000

15% of 100 $\Rightarrow$ Rs. 45000

Value of 15 units $\rightarrow$ Rs. 45000

Value of 1 unit $\rightarrow$ Rs. 3000

So Difference between A & B = $(90 - 72) \times 3000$
 $= 18 \times 3000 = 54000$

269. (d) No. of safe males = $\frac{80}{100} \times 700 = 560$

No. of safe females = $\frac{60}{100} \times 500 = 300$

No. of safe children = $\frac{90}{100} \times 800 = 720$

Total safe population = 1580

% age = $\frac{1580}{(700 + 500 + 800)} \times 100$

$$= \frac{1580}{2000} \times 100 = 79\%$$

270. (b) Increased price of table = $200 \times \frac{120}{100} = \text{Rs. } 240$

Increased price of Chair = $140 \times \frac{130}{100} = \text{Rs. } 182$

So value of 24 tables + 25 chairs
 $= 24 \times 240 + 25 \times 182 = \text{Rs. } 10310$

271. (b) According to the question,

Let d = 150

$$\begin{array}{cccc} a & b & c & d \\ 48 & 240 & 200 & 150 \end{array}$$

$$\begin{aligned} \text{Now } \frac{20}{100} \times \frac{2a}{b+c} &= \left(\frac{2 \times 48}{440} \right) \times \frac{1}{5} \\ &= \frac{1}{5} \left(\frac{48}{220} \right) = \frac{12}{275} \end{aligned}$$

Alternatively:

$$\begin{array}{ccc} A : B & B : C & C : D \\ 1 : 5 & 6 : 5 & 4 : 3 \\ A : B : C : D = 24 : 120 : 100 : 75 \end{array}$$

$$\text{Now, } \frac{20}{100} \times \frac{2a}{b+c} = \left(\frac{2 \times 24}{5 \times 220} \right) = \frac{12}{275}$$

272. (d) Let his income = $100x$

Increased income = $100x + 4800$

$$\text{Income tax paid earlier} = \frac{12}{100} \times 80x = \frac{48x}{5}$$

($\because$ As 20% income is tax free)

$$\text{Income tax paid later} = \frac{10}{100} (100x + 4800) \times \frac{4}{5}$$

$$= (10x + 480) \frac{4}{5}$$

According to the question,

$$\frac{48x}{5} = (10x + 480) \frac{4}{5}$$

$$x = 240$$

Initial Total income = $240 \times 100 = 24000$

Increment income = 4800

total income = $24000 + 4800 = 28,800$

273. (c) Let initially in Rs. 100 $\rightarrow$ 100kg pulses are available

Rs. 100 $\rightarrow$ 100 kg

Now Rs. 132 $\rightarrow$ 100 kg

$$\text{So in Rs. } 110 \rightarrow \frac{100}{132} \times 110 = \frac{1000}{12}$$

given, his current consumption is 150 kg

$$\Rightarrow \frac{1000}{12} \rightarrow 150$$

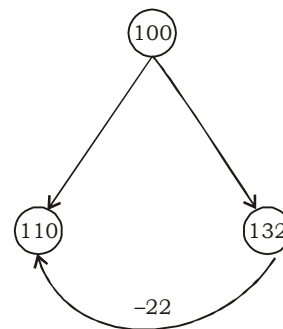
$$1 \rightarrow \frac{150}{1000} \times 12$$

$$\text{Initial consumption} = \frac{150}{1000} \times 12 \times 100 = 180\text{kg}$$

Alternatively

Let initial expenditure = Rs. 100

According to the question,



$$\text{Reduction} = \frac{22}{132} = \frac{1}{6} = \frac{5}{6} \rightarrow \text{New}$$

$$5 \text{ units} = 150 \text{ kg}$$

$$1 \text{ unit} = \frac{150}{5} \text{ kg}$$

$$6 \text{ units} = \frac{150}{5} \times 6 = 180 \text{ kg}$$

$$\text{Initial consumption} = 180 \text{ kg}$$

274. (b) Let toys are	A	B	C
	500	400	200
Toys destroyed	50	40	20
Toys remaining	450	360	180

Domestic consumption = products which are not exported.

	A	B	C
	↓	↓	↓
Products	450	360	180
not exported →	$\frac{60}{100} \times 450$	$\frac{70}{100} \times 360$	$\frac{80}{100} \times 180$
	↓	↓	↓
	270	252	144

$$\text{required percentage} = \frac{270+252+144}{1100} \times 100$$

$$= \frac{666}{1100} \times 100 = 60.55\% = 60\frac{6}{11}\%$$

275. (a) Let the capacity of the vessel = C
According to the question,
(100 - K)% of C = P

$$\frac{100 - K}{100} \times C = P$$

$$C = \left(\frac{100P}{100 - K} \right)$$

Required oil to fill the vessel

$$= \frac{(100P)}{(100 - K)} \times \frac{K}{100} = \frac{KP}{100 - K}$$

276. (a) Total students = 12000

$$\text{girls} = \frac{2}{5} \times 12000 = 2 \times 2400 = 4800$$

$$\text{Boys} = 12000 - 4800 = 7200$$

$$\text{No. of passed boys} = \frac{40}{100} \times 7200 = 2880$$

$$\text{No. of passed girls} = \frac{55}{100} \times 4800 = 2640$$

$$\text{Total passed students} = 5520$$

No. of students passed in Ist division

$$= \frac{80}{100} \times 5520 = 4416$$

$$\text{Required percentage} = \frac{4416}{12000} \times 100$$

$$= 36.8\%$$

277. (c) Total population = 150000

$$\text{Males} = 78000$$

$$\text{Females} = 72000$$

$$\% \text{ age of literacy of men} = \frac{700}{1000} \times 100 = 70\%$$

$$\text{No. of literate men} = \frac{70}{100} \times 78000 = 54600$$

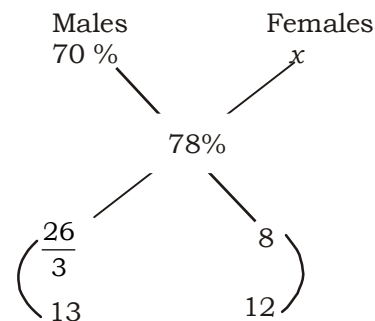
Total literate population

$$= \frac{(100 - 22)}{100} \times 150000 = 117000$$

$$\text{No. of literate women} = 117000 - 54600 = 62400$$

$$\% \text{ age literacy of women} = \frac{62400}{72000} \times 100 = 86\frac{2}{3}\%$$

Alternatively :- By Alligation,



Ratio of males : Females

$$\frac{78}{39} : \frac{72}{36}$$

$$\frac{13}{13} : \frac{12}{12}$$

$$\Rightarrow 12 \rightarrow 8$$

$$13 \rightarrow \frac{8}{12} \times 13 \Rightarrow \frac{26}{3}$$

$$\Rightarrow \text{Female \% literacy} = x - 78 = \frac{26}{3}$$

$$x = 86\frac{2}{3}\%$$

278. (c) Let total no. of voting list = $100x$

Total votes polled = $90x$

Valid votes = $90x - 1200$

Winner gets votes = $68x$

So, loser gets votes = $(90x - 1200) - 68x$
 $= 22x - 1200$

So, according to the question,

$$68x - (22x - 1200) = 56400$$

$$46x + 1200 = 56400$$

$$46x = 56400 - 1200$$

$$x = \frac{55200}{46}$$

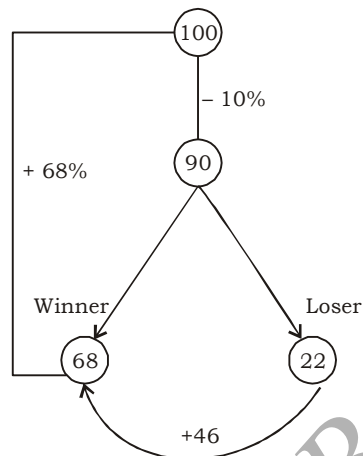
Votes in favour of losing candidates

$$\Rightarrow 22 \times \frac{55200}{46} - 1200 = 25200$$

Alternate:-

Let the total votes = 100

According to the question,



$$46 \text{ units} = (56400 - 1200) = 55200$$

↓

(invalid votes)

$$1 \text{ unit} = \frac{55200}{46}$$

$$22 \text{ units} = \frac{55200}{46} \times 22$$

Votes for losing candidates =

$$\left(\frac{55200}{46} \times 22 - 1200 \right) = 25200$$

279. (a) Per day wages = $\frac{4800}{60} = \text{Rs. } 80$

$$\text{Increased wages} = 80 \times \frac{110}{100} = \text{Rs. } 88$$

$$\text{Reduced work days} = 60 - \frac{15}{100} \times 60 = 51 \text{ days}$$

$$\text{So new earning of labourer} = 88 \times 51 = 4488$$

$$\text{So difference in earnings} = 4800 - 4488 = \text{Rs. } 312$$

So he will earn Rs. 312 less now.

Alternate:-

$$10\% = \frac{1}{10}, 15\% = \frac{3}{20}$$

According to the question

	Old	New
Wages →	10	11
Time →	20	17
Total wages →	200	187
		-13

$$200 \text{ units} = 4800$$

$$1 \text{ unit} = \frac{4800}{200} = 24$$

$$13 \text{ units} = 24 \times 13 = \text{Rs. } 312$$

So he will earn Rs. 312 less

280. (b) Matches played = 40

$$\text{Matches won} = \frac{40}{100} \times 40 = 16$$

Let the no. of matches it wins in a row = x

So, according to the question,

$$\frac{16 + x}{40 + x} = \frac{4}{5} \Rightarrow 80 + 5x = 160 + 4x$$

$$\Rightarrow x = 80$$

281. (a) Let sales done by him is $100x$

case I : Earning are = $6x$

Case II : Earnings are = $1200 + (100x - 5000) \times$

$$\frac{3}{100} = 1200 + (3x - 150)$$

According to the question,

$$6x - (1200 + 3x - 150) = 1350$$

$$\Rightarrow 3x - 1200 + 150 = 1350$$

$$\Rightarrow 3x = 1350 + 1050$$

$$\Rightarrow 3x = 2400 \Rightarrow x = 800$$

$$\text{Total sales} = 100 \times 800 = \text{Rs. } 80000$$

282. (a) Let the marks obtained by both student = 100

$\therefore$ marks of one student = 56 % of 100 = 56

and marks of other student = $100 - 56 = 44$

difference in marks = $56 - 44 = 12$

Ratio value	Original value
(Difference in marks) $\rightarrow 12$	$\rightarrow 9$
$\therefore 56$	$\rightarrow \frac{9}{12} \times 56 = 42$
and 44	$\rightarrow \frac{9}{12} \times 44 = 33$

$\therefore$ marks obtained are 42 and 33.

283. (a) Let 1st no = x and 2nd no. = y
Now, according to the question,

$$\Rightarrow 30x = \frac{80}{100} (6y)$$

$$\Rightarrow 30x = \frac{4}{5} \times 6y \Rightarrow 25x = 4y$$

$$\Rightarrow \frac{y}{x} = \frac{25}{4}$$

$$\text{Required \% age} = \frac{25}{4} \times 100 = 625\%$$

284. (b) Total applicants = 50000

$$\text{Present applicants} = 50000 \times \frac{90}{100} = 45000$$

$$\text{Selected for interview} = \frac{40}{100} \times 45000 = 18000$$

Declared successful in interview

$$= 18000 \times \frac{30}{100} = 5400$$

% age of selected applicants in interview

$$= \frac{5400}{50000} \times 100 \Rightarrow 10.8\%$$

285. (c) $20\% = \frac{1}{5}$

	Old	:	New
Wages $\rightarrow$	5	:	6
Time $\rightarrow$	5	:	4
	$\times$		
Total wages $\rightarrow$	25	:	24
	$\times 160$		
	4000	:	3840

for 1 week wages = Rs. 3840

for 4 week wages = $3840 \times 4 = \text{Rs. } 15360$

286. (a) Total salary = Rs. 5000

$$\text{Money spent on food} = \frac{5}{7} \times 5000$$

$$\text{Money spent on clothes} = \frac{2}{7} \times 5000$$

Increased expenditure on clothes

$$= \frac{2}{7} \times 5000 \times \frac{110}{100}$$

Increased expenditure on food

$$= \frac{5}{7} \times 5000 \times \frac{120}{100}$$

Total expenditure now

$$= \frac{2 \times 5000 \times 110 + 5 \times 5000 \times 120}{700}$$

$$= \frac{5000}{700} (220 + 600) = \frac{50}{7} (820) \Rightarrow \frac{41000}{7}$$

$$\text{So increase in salary} = \frac{41000}{7} - 5000$$

$$= \frac{41000 - 35000}{7} = \frac{6000}{7}$$

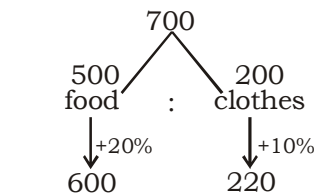
$$\% \text{ age increment} = \frac{6000}{7(5000)} \times 100 = 17\frac{1}{7}\%$$

Alternate:-

Note: In such type of questions assume values as per your requirement to save your valuable time.

Let monthly salary of Ramesh = Rs. 700

According to the question,



New salary = 820

$$\text{increase in salary} = \frac{(820 - 700)}{700} \times 100$$

$$= \frac{120}{7} = 17\frac{1}{7}\%$$

287. (c) Let total salary = 1300

Expenditure = 800

saving = 500

$$\text{Expenditure on food} = \frac{20}{100} \times 800 = \text{Rs. } 160$$

$$\text{expenditure on clothes} = \frac{40}{100} \times 800 = \text{Rs. } 320$$

$$\text{Money deposited in bank} = \frac{60}{100} \times 500$$

$$= \text{Rs. } 300$$

Required % age

$$= \frac{\text{Money spent on clothes}}{\text{amount deposited in bank}} \times 100$$

$$= \frac{320}{300} \times 100 = \frac{320}{3} = 106\frac{2}{3}\%$$

288. (b) Let no. is $100x$, and other no. = y

according to the question,

$$125x = y - 300$$

$$\text{and } 150x = y - 200$$

subtract both equations,

$$- 25x = -100$$

$$\Rightarrow x = 4$$

so, 1st no = 400 and $150x = y - 200$

$$150 \times 4 = y - 200$$

$$y = 800$$

$$\Rightarrow x + y = 1200$$

Alternate:-

Let the first number = x

let the second number = y

according to the question,

$$\text{condition (i) } y - x \times \frac{125}{100} = 300$$

$$4y - 5x = 1200$$

..... (i)

$$\text{condition (ii) } y - \frac{150}{100} = 200$$

$$2y - 3x = 400$$

..... (ii)

from equation (i) and (ii)

$$x = 400, y = 800$$

$$x + y = 400 + 800 = x + y = 1200$$

sum of the number = 1200

$$289. (a) \begin{array}{cccc} A & : & B & : & C & : & D \\ \text{Income} & 700 & : & 400 & : & 800 & : & 1000 \end{array}$$

$$\text{Expenditure of A} = 700 \times \frac{20}{100} = \text{Rs. } 140$$

$$\text{Expenditure of B} = 400 \times \frac{70}{100} = \text{Rs. } 280$$

$$\text{Expenditure of C} = 800 \times \frac{60}{100} = \text{Rs. } 480$$

$$\text{Expenditure of D} = 1000 \times \frac{10}{100} = \text{Rs. } 100$$

Total expenditure = Rs. 1000

and total income = $700 + 400 + 800 + 1000$

= Rs. 2900

According to the question,

$$(2900 - 1000) \rightarrow \text{Rs. } 1900$$

$$1900 \rightarrow \text{Rs. } 5700$$

$$1 \rightarrow \text{Rs. } 300$$

Total income = $300 \times 29 = \text{Rs. } 8700$

290. (a) Let capacity of vessels = 10 litres

then According to the questions,

Amount of liquid in first vessel

$$= \frac{75}{100} \times 10 = 7.5$$

amount of liquid in second vessel

$$= \frac{70}{100} \times 30 = 21$$

amount of liquid in third vessel

$$= \frac{60}{100} \times 90 = 54$$

amount of liquid in fourth vessel

$$= \frac{80}{100} \times 270 = 216$$

Total liquid content in fifth vessel = 298.5 litres

Total capacity of all four vessel

$$= 10 + 30 + 90 + 270 = 400$$

$$\text{Required \% age} = \frac{298.5}{400} \times 100 \Rightarrow \frac{298.5}{4}$$

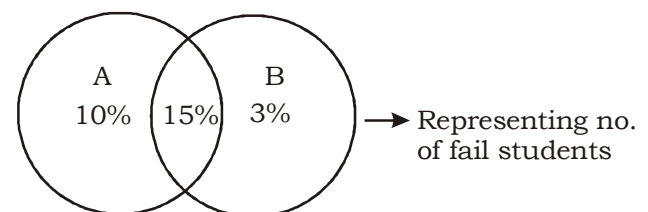
$$= 74\frac{5}{8}\%$$

291. (d) Let Madan scores = 180 (Always assume a no. that will make calculation easier.)

then according to the question,

Mohan	Sohan	Rajiv	Madan
300	200	240	180
$\downarrow \times 5$			$\downarrow \times 5$
1500			900

292. (a) By set theory



$$\% \text{ age of failed students} = 10 + 15 + 3 = 28\%$$

% age of passed students = $100 - 28 = 72\%$

According to the question,

$$72\% = 1620$$

$$1\% = \frac{1620}{72}$$

$$\text{Total students} = \frac{1620}{72} \times 100 = 2250$$

Total passed students in section A

$$= \frac{1620}{72} \times 10 = 225$$

293. (b) let total population of the village = 300

Males = 200, females = 100

$$\text{literate males} = \frac{80}{100} \times 200 = 160$$

$$\text{literate females} = \frac{70 \times 100}{100} = 70$$

$$\text{graduate males} = \frac{160 \times 40}{100} = 64$$

$$\text{graduate females} = \frac{70 \times 30}{100} = 21$$

$$\text{males in government service} = \frac{64 \times 20}{100} = \frac{64}{5}$$

$$\text{Females in government service} = \frac{21 \times 25}{100} = \frac{21}{4}$$

$$\text{required percentage} = \frac{\frac{64}{5} + \frac{21}{4}}{\frac{64}{5} + \frac{21}{4}} \times 100$$

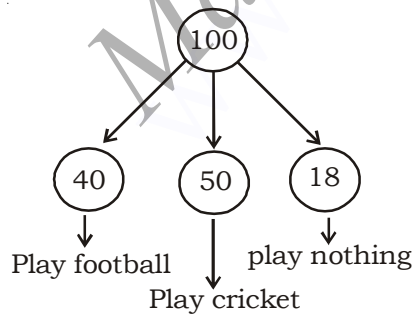
$$\frac{1}{3} \left(\frac{256 + 105}{20} \right) = \frac{(361)}{3 \times 20} \Rightarrow 6.01\% \text{ (approx.)}$$

294. (d) Let total students = 100

$\therefore$ 18 students play neither football nor cricket.

$\therefore$ Total number of students who play either football or cricket or both

$$= 100 - 18 = 82$$



But, Total number of students who play either football or cricket = $40 + 50 = 90$

According to question

Total no. of students playing both

$$= 90 - 82 = 8$$

i.e. 8 %

Alternatively:-

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

$$\Rightarrow 82 = 40 + 50 - n(A \cap B)$$

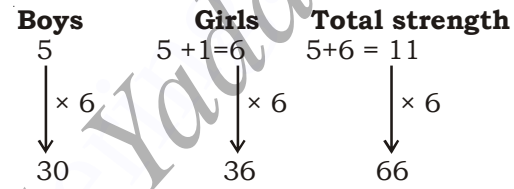
$$\Rightarrow n(A \cap B) = 90 - 82 = 8$$

$\therefore$ 8 % students play both games.

295. (b)

Total strength = 66

$$\therefore 20\% = \frac{1}{5} \times 20\%$$



296. (c) Let the original fraction be $\frac{x}{y}$.

According to the question,

$$\frac{\frac{120x}{100}}{\frac{95y}{100}} = \frac{5}{2} \Rightarrow \frac{120x}{95y} = \frac{5}{2} \Rightarrow \frac{x}{y} = \frac{5}{2} \times \frac{95}{120} = \frac{95}{48}$$

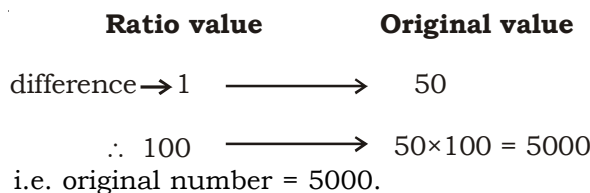
297. (b) Let the original number = 100

After decreased by 10 %, new number = 90

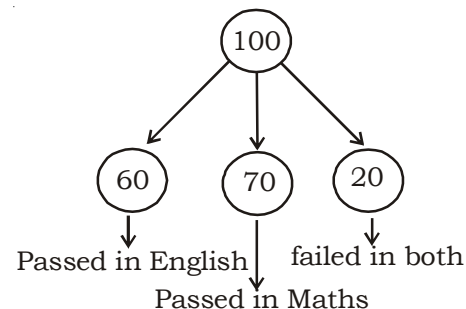
After increased by 10 %, Final number

$$= 90 + 10\% \text{ of } 90 = 99$$

$$\therefore \text{difference} = 100 - 99 = 1$$



298. (d) Let total candidates = 100



∴ 20 candidates failed in both

∴ Candidates passed in either English or Maths or both = $100 - 20 = 80$

But, According to question,

$60 + 70 = 130$ candidates passed in English and Maths

∴ Candidates passed in both = $130 - 80 = 50$

Ratio value Original value

50 → 2500

∴ 100 → 5000

i.e. total candidates appeared = 5000.

299. (b) Percent of families having either a cow or buffalo or both = $60 + 30 - 15 = 75$

It means 25 % families do not have a cow or a buffalo

∴ Required number of families = 25% of 96

$$= \frac{1}{4} \times 96 = 24$$

300. (c) Let the number of students in the class be 100.

∴ Number of students in Biology = 72 and number of students in Maths = 44

∴ Number of students opting for both subjects = $72 + 44 - 100 = 16$

∴ When 16 students opt for both subjects, total number of students = 100

∴ When 40 students opt for both subjects, total

$$\text{number of students} = \frac{100}{16} \times 40 = 250$$

301. (b)

$$25\% = \frac{1}{4} \quad \text{and} \quad 30\% = \frac{3}{10}$$

	Initial	Final
Price	→ 4	$4 - 1 = 3$
Daily sale	→ 10	$10 + 3 = 13$

$$\text{Daily sale receipt} \rightarrow 4 \times 10 = 40 \quad 3 \times 13 = 39$$

∴ % decrease in daily sale receipt

$$= \frac{40 - 39}{40} \times 100 = \frac{100}{40} = \frac{5}{2}\% = 2\frac{1}{2}\%$$

302. (b) Let the number of books in shelf B be 100.

∴ Number of books in shelf A = $\frac{4}{5} \times 100 = 80$

On transferring 25 % i.e. $\frac{1}{4}$ of books of shelf A to shelf B.

$$B = 100 + \frac{1}{4} \times 80 = 120$$

Again, On transferring $\frac{1}{4}$ of books of shelf B to shelf A.

$$A = 80 + \frac{1}{4} \times 120 = 90$$

$$\therefore \text{Required percentage} = \frac{90}{180} \times 100 = 50\%$$

303. (b) $A \cong 360$

$$B \cong \frac{360 \times 100}{90} = 400$$

$$C \cong \frac{400 \times 100}{125} = 320$$

$$D \cong \frac{320 \times 100}{80} = 400$$

$$\therefore \text{Required percentage} = \frac{400}{500} \times 100 = 80\%$$

304. (b) Let quantity of an ore = 100 kg

∴ quantity of an alloy = 25 kg

∴ quantity of iron = 90 % of 25 = 22.5

To obtain 22.5 kg of pure iron, quantity of ore needed = 100 kg

∴ To obtain 60 kg of pure iron, required quantity

$$\text{of ore} = \frac{100}{22.5} \times 60 = 266.67$$

305. (b) Total revenue earned

$$= \text{Rs.} \left(9900 \times \frac{20}{100} \times 10 + 9900 \times \frac{80}{100} \times 20 \right)$$

$$= \text{Rs.} (19800 + 158400) = \text{Rs.} 178200$$

306. (d) Let total amount = 100

∴ Spent on article = 20

Remaining amount = $100 - 20 = 80$

Spent on transport = 5 % of 80 = 4

∴ Remaining amount = $80 - 4 = 76$

But according to the question, amount left = $1400 + 120 = 1520$

Ratio value Original value

76 → 1520

$$\therefore 1 \quad \rightarrow \quad \frac{1520}{76} = 20$$

$$\therefore 4 \quad \rightarrow \quad 20 \times 4 = 80$$

i.e. amount spent on transport = Rs. 80

307. (a) percentage of candidates who failed in one or two or both subjects = $52 + 42 - 17 = 77$

$\therefore$ percentage of passed candidates
= $100 - 77 = 23$.

308. (d) Number of valid votes

$$= 104000 \times \frac{98}{100} = 101920$$

$\therefore$ valid votes received by the candidates

$$= \frac{101920 \times 55}{100} = 56056$$

309. (a) According to question,

$(18 - 15)\%$ of starting income = 15% of 6000

$\therefore 3\% \times$ starting income = $15\% \times 6000$

$$\Rightarrow \text{starting income} = \frac{15}{3} \times 6000 = 30,000/-$$

Alternatively:-

Let starting income = $100x$

$\therefore$ increased income = $100x + 6000$

$\therefore$ According to question,

18% of $(75\%$ of $100x$) = 15% of $[75\%$ of $(100x + 6000)]$

$$\Rightarrow \frac{18}{100} \times \frac{75}{100} \times 100x$$

$$= \frac{15}{100} \left[\frac{75}{100} \times (100x + 6000) \right]$$

$$\Rightarrow 90x = (75x + 4500)$$

$$\Rightarrow x = \frac{4500}{15} = 300$$

$\therefore$ starting income = $100x = 100 \times 300 = \text{Rs. } 30,000$

310. (c) Let total sale = $x + 10,000$

According to the question,

4% of $x + 3000 = 7\%$ of $(x + 10,000) + 800$

$$\Rightarrow 4\% \text{ of } x + 3000 = 7\% \text{ of } x + 1500$$

$$\Rightarrow 3\% \text{ of } x = 1500$$

$$\Rightarrow x = \frac{1500 \times 100}{3} = 50,000$$

$\therefore$ total sale = $x + 10,000$

$$= 50,000 + 10,000 = 60,000/-$$

311. (d) Let the number be $10x + x^2$

$$\therefore (10x + x^2) = (10x^2 + x) = 54$$

$$\therefore 9(x^2 - x) = 54$$

$$\therefore x^2 - x - 6 = 0$$

$$\Rightarrow (x - 3)(x + 2) = 0$$

$$\therefore x = 3$$

$\therefore$ The original number = $10 \times 3 + (3)^2 = 39$

$$\therefore 40\% \text{ of } 39 = \frac{40 \times 39}{100} = 15.6$$

312. (b) Let the amount of iron be x kg

After first blast furnace process, iron removed = 12.5% of $200 = 25$ kg

According to the question,

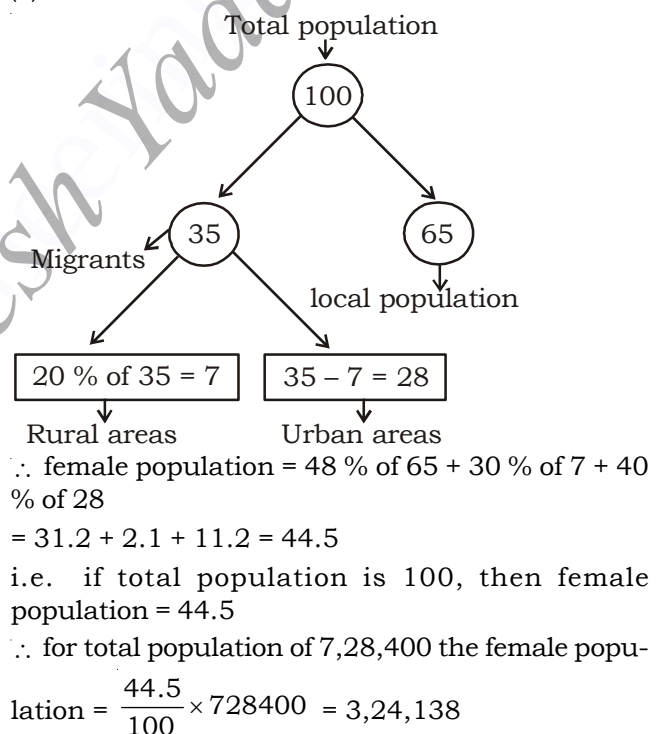
$$1.2 \left(\frac{x}{500} \right) = \frac{x - 25}{300}$$

$$\Rightarrow 3.6x = 5x - 125$$

$$\Rightarrow 1.4x = 125$$

$$\therefore x = \frac{125}{1.4} = 89.28 \text{ kg.}$$

313. (c)



314. (b) Expenditure by Ajay on batteries,

$$= 80\% \text{ of } 150 + \frac{150}{2}$$

$$= 120 + 75 = \text{Rs } 195$$

315. (d) Let total students = 100

Boys 60

Girls 40

No. of students getting fee waiver

$$= 60 \times \frac{15}{100} + 40 \times \frac{7.5}{100} = 12$$

Now

$$12 \text{ R} = 90$$

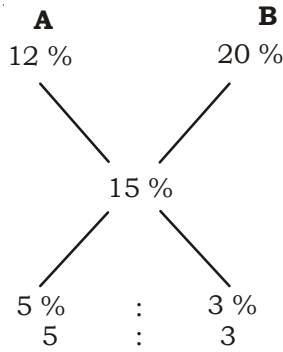
$$100 = \frac{90}{12} \times 100 = 750$$

No. of students who are not getting fee waiver
= 750 - 90 = 660

So 50% of these will get 50% concession

$$= \frac{660}{2} = 330$$

316. (d) From the que. we can see that 15% of the whole sum is spent
So,



$$\text{A's share} = 1200 \times \frac{5}{8} = 750$$

$$\text{A is left with} = 750 \times \frac{88}{100} = \text{Rs. } 660$$

317. (d) Let his salary = A
increased ,, = B
According to question,

$$A \times 12 = B \times 10$$

$$A : B$$

$$\frac{5}{6}$$

$$1 \text{ R} = 4800$$

$$\text{increased } 6 \text{ R} = 4800 \times 6 = 28800$$

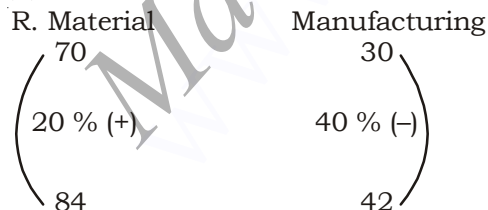
$$318. (d) 33.33\% = \frac{1}{3}$$

Ratio of run rate Before : Now
3 : 4

it means $3x \times 40 = 4x \times 30$

Now, we can say that there is not sufficient information.

319. (a) Let total cost = 100



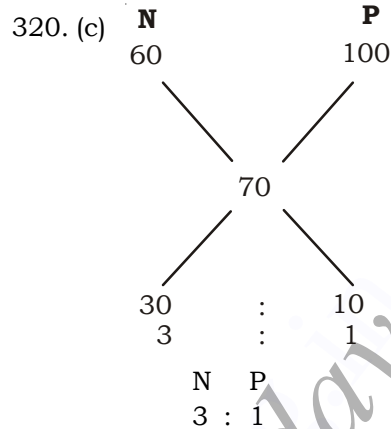
$$\text{SP} = 100 \times \frac{11}{10} = 110$$

$$\text{New SP} = 110 \times \frac{180}{100} = 198$$

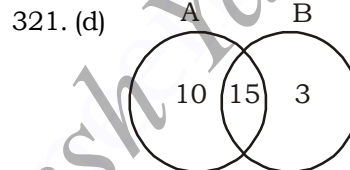
$$\text{and new CP} = 84 + 42 = 126$$

$$\text{SP} = 198$$

$$P\% = \frac{72}{126} \times 100 = 57.14\%$$



$$\frac{3}{1} \times 100 = 300\%$$



Let total students = 100

Then pass = 100 - 28 = 72

but 72 R = 1620

$$100 \text{ R} = \frac{1620}{72} \times 100$$

Total student = 2250

$$\text{failed only in section A} = \frac{2250}{100} \times 10 = 225$$

$$322. (a) 40\% = \frac{2}{5} \text{ increase before}$$

$$20\% = \frac{1}{5} \text{ decrease before}$$

From the question,

$$P = K \frac{T}{V}$$

$$P_1 = \frac{5}{5}$$

$$P_1 = 1$$

$$P_2 = \frac{7}{4}$$

$$\text{increase} = \frac{7}{4} - 1 = \frac{3}{4}$$

$$\text{increase \%} = \frac{3}{4} \times 100 = 75\%$$



02

Profit and Loss

Theory and Concepts :-

In day- to-day life we sell and purchase the things as per our requirement. A customer can get things in the following manner :

Manufacturer(or producer)
 —————> Whole-seller (shopkeeper or sales person) —————> Retailer
 —————> Customer

Terminology

- **Cost Price (C.P.)** : The price at which an article is bought is called its cost price. It is abbreviated as C.P.
- **Selling Price (S.P.)** : The price at which an article is sold is called its selling price. It is abbreviated as S.P.
- **Profit or Gain** : If the selling price of an article is more than the cost price, there is a gain or profit.
 Thus, profit or gain = S.P – C.P.
 when S.P > C.P.
- **Loss** : If the cost price of an article is greater than the selling price, the seller suffers a loss.
 Thus, Loss = C.P. – S.P., C.P. > S.P.

Important Formulae

- (i) Profit = S.P. – C.P.
- (ii) Loss = C.P. – S.P.
- (iii) Profit Percentage

$$= \frac{\text{Profit}}{\text{C.P.}} \times 100$$

- (iv) Loss percentage

$$= \frac{\text{Loss}}{\text{C.P.}} \times 100$$

$$(v) \text{ S.P.} = \left(\frac{100 + \text{gain}\%}{100} \times \text{C.P.} \right)$$

$$= \left(\frac{100 - \text{loss}\%}{100} \times \text{C.P.} \right)$$

$$(vi) \text{ C.P.} = \left(\frac{100}{100 + \text{gain}\%} \times \text{S.P.} \right)$$

$$(v) = \left(\frac{100}{100 - \text{loss}\%} \times \text{S.P.} \right)$$

$$(vii) \text{ S.P.} = (100 + x)\% \text{ of C.P.};$$

when profit = x % of C.P.

$$(viii) \text{ S.P.} = (100 - x)\% \text{ of C.P.};$$

when loss = x % of C.P.

Note :- Profit or loss is always calculated on the basis of cost price unless otherwise mentioned in the problem.

Overhead Expenses (or overheads):

If an article is purchased for some amount and there are some additional expenses on transportation, labour, commission etc, these are to be added in the cost price. Such expenses are called overheads.

→ We will solve all the problems with the help of ratio. For this some percentage in the form of fraction given below (memorize all of them to speed up your calculation)

$$2\% = \frac{1}{50}$$

$$\times 3 \left\{ \begin{array}{l} 4\% = \frac{1}{25} \\ 12\% = \frac{12}{100} = \frac{3}{25} \end{array} \right.$$

$$\times 3 \left\{ \begin{array}{l} 36\% = \frac{36}{100} = \frac{9}{25} \end{array} \right.$$

$$20\% = \frac{1}{5}$$

$$6\frac{1}{4}\% = \frac{1}{16}$$

$$11\frac{1}{9}\% = \frac{1}{9}$$

$$\left(\begin{array}{l} \times \frac{1}{2} \rightarrow 66\frac{2}{3}\% = \frac{2}{3} \\ \times \frac{1}{2} \rightarrow 33\frac{1}{3}\% = \frac{1}{3} \\ \times \frac{1}{2} \rightarrow 16\frac{2}{3}\% = \frac{1}{6} \\ \times \frac{1}{2} \rightarrow 8\frac{1}{3}\% = \frac{1}{12} \end{array} \right) \times \frac{1}{2}$$

$$14\frac{2}{7}\% = \frac{1}{7}$$

$$\left(\begin{array}{l} \times 7 \rightarrow 12\frac{1}{2}\% = \frac{1}{8} \\ \times 3 \rightarrow 37\frac{1}{2}\% = \frac{3}{8} \end{array} \right) \rightarrow 87\frac{1}{2}\% = \frac{7}{8}$$

$$69\frac{3}{13}\% = \frac{9}{13}$$

Note :- When we change profit % or loss % in fraction then numerator shows profit value or loss value respectively and denominator value shows Actual value at which profit % or loss % is calculated. It can be C.P. or S.P.

Examples

- (i) If profit is $11\frac{1}{9}\%$ (calculated on C.P.), then

$$11\frac{1}{9}\% = \frac{1}{9} \rightarrow \text{Profit}$$

$$\Rightarrow \text{profit : C.P.} = 1 : 9$$

$$\text{Since S.P.} = \text{C.P.} + \text{profit}$$

$$= 9 + 1 = 10$$

$$\therefore \text{CP : SP} = 9 : 10$$



- (ii) If loss in $14\frac{2}{7}\%$ calculated on C.P. then

$$14\frac{2}{7}\% = \frac{1}{7} \longrightarrow \text{Loss}$$

$$\Rightarrow \text{Loss : C.P.} = 1 : 7$$

$$\therefore \text{S.P.} = \text{C.P.} - \text{Loss} = 7 - 1 = 6$$

$$\Rightarrow \text{S.P. : C.P.} = 6 : 7$$

- (iii) If profit is $6\frac{1}{4}\%$ calculated on C.P., then

$$6\frac{1}{4}\% = \frac{1}{16} \longrightarrow \text{Profit}$$

$$\text{Profit : C.P.} = 1 : 16 \quad \text{C.P. : S.P.}$$

$$1 : 16 \Rightarrow 16 : 17$$

- (iv) If loss is $6\frac{1}{4}\%$ calculated on C.P., then

$$6\frac{1}{4}\% = \frac{1}{16} \longrightarrow \text{Loss}$$

$$\text{Loss : C.P.} = 1 : 16 \quad \text{C.P. : S.P.}$$

$$1 : 16 \Rightarrow 16 : 15$$

Note :- While solving the questions we compare (actual) value with the ratio value to find out the required value of answer.

e.g. C.P. = 50, profit = 20%, S.P. = ?

$$\text{Sol. } 20\% = \frac{1}{5} \longrightarrow \text{Profit}$$

$$\therefore \text{S.P.} = 5 + 1 = 6$$

$$\Rightarrow \text{S.P. : C.P.} = 6 : 5$$

$$\begin{array}{c} 6 \\ \downarrow \times 10 \\ \textcircled{60} \end{array} \quad \begin{array}{c} 5 \\ \downarrow \times 10 \\ 50 \text{ (given)} \end{array}$$

$$\text{or } 5 \equiv 50$$

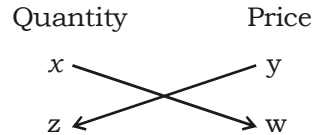
$$\therefore 6 \equiv \frac{50}{5} \times 6 = 60$$

i.e. S.P. = Rs. 60

Some Useful Shortcut Methods :

1. If a man buys x items for Rs. y and sells z items for Rs. w , then the gain or loss per cent made by him is

$$\left(\frac{xw}{zy} - 1 \right) \times 100\%$$



Example :- If 6 oranges are bought for Rs. 5 and sold at 5 for Rs. 6, what is the gain or loss per cent ?

Sol. Quantity Price

$$6 \quad 5 \text{ (c.p.) } 5 \times 5 = 25$$

$$5 \quad 6 \text{ (s.p.) } 6 \times 6 = 36$$

$$\therefore \% \text{ profit} = \frac{36 - 25}{25} \times 100 = 44\%$$

2. If the cost price of m articles is equal to the selling price of n articles, then

$$\% \text{ gain or loss} = \frac{m - n}{n} \times 100$$

[If $m > n$, it is % gain and if $m < n$, it is % loss]

Example :-

If the selling price of 9 articles is equal to the cost price of 12 articles. What is the profit % or loss % ?

Sol. Here, $m = 12$, $n = 9$

$$\therefore m > n$$

$$\therefore \text{profit \%} = \frac{m - n}{n} \times 100$$

$$= \frac{12 - 9}{9} \times 100 = \frac{1}{3} \times 100 = 33\frac{1}{3}\%$$

3. If 'A' sells an article to 'B' at a gain/loss of $m\%$ and 'B' sells it to 'C' at a gain/loss of $n\%$, then the resultant profit/loss percent is given by

$$m + n + \frac{mn}{100} \dots\dots\dots(i)$$

where m or n will be negative, if it indicates a loss, otherwise it will be positive.

Note :- The expression given by (i) represents resultant profit or loss accordingly as it can be positive or negative.

4. When two different articles are sold at the same selling price getting a gain of $x\%$ on the first and loss of $x\%$ on the second, then the overall % loss is the transaction in given by

$$\left(\frac{x}{10} \right)^2 \%$$

Note:- that in such questions there is always a loss.

5. A merchant uses faulty measure and sells his goods at a gain/loss of $x\%$. The overall percent gain/loss is given by

$$\frac{100 + g}{100 + x} = \frac{\text{True measure}}{\text{Faulty measure}}$$

Note :- If the merchant sells his goods at cost price, then $x = 0$

6. If the price of an item is increased by $x\%$, then the consumption should be decreased

$$\text{by } \left(\frac{x}{100 + x} \right) \%$$

So that expenditure remains same.

7. If the price of an item is decreased by $x\%$, then the consumption should be increased

$$\text{by } \left(\frac{x}{100 - x} \right) \% \text{ so that expenditure remains same.}$$

8. If a shopkeeper do $x\%$ cheating at the time of selling. Or In other word, A shopkeeper gains $x\%$ while buying the goods and $y\%$ while selling them, then his total profit %

$$= \left(x + y + \frac{xy}{100} \right) \%$$



Examples

1. The cost price of 36 books is equal to the selling price of 30 books. The gain percent is:

- (a) 20% (b) $16\frac{4}{6}\%$
(c) 18% (d) $82\frac{2}{6}\%$

Sol. (a) Given :

$$36 \text{ C.P} = 30 \text{ S.P}$$

$$\frac{\text{CP}}{\text{SP}} = \frac{30}{36} = \frac{5}{6} > 1 \text{ (Profit)}$$

$$\text{Profit}\% = \frac{\text{profit}}{\text{C.P}} \times 100$$

$$= \frac{1}{5} \times 100 = 20\%$$

2. The cost price of 15 articles is same as the selling price of 10 articles. The profit percent is :

- (a) 30% (b) 40%
(c) 50% (d) 45%

Sol. (c) Given

$$15 \text{ C.P} = 10 \text{ S.P}$$

$$\frac{\text{CP}}{\text{SP}} = \frac{10}{15} = \frac{2}{3} > 1 \text{ (Profit)}$$

$$\text{Profit}\% = \frac{1}{2} \times 100 = 50\%$$

3. The selling price of 5 articles is the same as the cost price of 3 articles. The gain or loss percent is:

- (a) 20% gain (b) 25% gain
(c) 33.33% loss (d) 40% loss

Sol. (d) S.P of 5 article = C.P of 3 article

$$\frac{\text{S.P}}{\text{C.P}} = \frac{3}{5}$$

$$\therefore \text{Loss} = 5 - 3 = 2$$

$$\text{Loss} = \frac{2}{5} \times 100 = 40\%$$

4. If 3 toys are sold at the cost price of 4 toys of the same kind, the profit will be:

- (a) 25% (b) $33\frac{1}{3}\%$
(c) $66\frac{2}{3}\%$ (d) 50%

Sol. (b) According to question,

$$3 \text{ S.P} = 4 \text{ C.P}$$

$$\frac{\text{S.P}}{\text{C.P}} = \frac{4}{3} > 1 \text{ gain}$$

$$\text{gain}\% = \frac{\text{Gain}}{\text{C.P}} \times 100$$

$$= \frac{1}{3} \times 100 = 33\frac{1}{3}\%$$

5. If the cost price of 15 tables is equal to selling price of 20 tables. The loss percent is :

- (a) 20% (b) 30%
(c) 25% (d) 37.5%

Sol. (c) According to question,

$$15 \text{ C.P} = 20 \text{ S.P}$$

$$\frac{\text{C.P}}{\text{S.P}} = \frac{20}{15} > 5 \text{ units loss}$$

$$\therefore \text{Loss}\% = \frac{5}{20} \times 100 = 25\%$$

6. The cost price of 18 articles is equal to the selling price of 15 articles. The gain percent is :

- (a) 15% (b) 20%
(c) 25% (d) 18%

Sol. (b) According to question,

$$18 \text{ C.P} = 15 \text{ S.P}$$

$$\frac{\text{C.P}}{\text{S.P}} = \frac{15}{18} > 3 \text{ units profit}$$

$$\text{Profit}\% = \frac{3}{15} \times 100 = 20\% \text{ profit}$$

7. The ratio of cost price and selling price is 5 : 4 the loss percent is :

- (a) 20% (b) 25%
(c) 40% (d) 50%

Sol. (a) According to question,

$$\frac{\text{C.P}}{\text{S.P}} = \frac{5}{4} > 1 \text{ unit loss}$$

$$\text{loss}\% = \frac{1}{5} = 20\% \text{ loss}$$

8. The ratio of the C.P and S.P of an article is 20 : 21. What is the gain percent ?

- (a) 5% (b) 5.5%
(c) 6% (d) 6.25%

Sol. (a) According to question,

$$\frac{\text{C.P}}{\text{S.P}} = \frac{20}{21} > 1 \text{ unit profit}$$

$$\text{profit}\% = \frac{1}{20} \times 100 = 5\%$$

9. If selling price of an article is $\frac{8}{5}$ times of its cost price, the profit percent on it is :

- (a) 120% (b) 160%
(c) 40% (d) 60%

Sol. (d) According to question,

$$\text{S.P} = \frac{8}{5} \times \text{C.P}$$

$$\frac{\text{S.P}}{\text{C.P}} = \frac{8}{5} > 3 \text{ gain}$$

$$\Rightarrow \text{gain}\% = \frac{3}{5} \times 100 = 60\%$$

10. If the cost price of 10 articles is equal to the selling price of 9 articles, the gain or loss percent is

- (a) $11\frac{1}{9}\%$ profit

- (b) $7\frac{6}{11}\%$ profit

- (c) $11\frac{1}{9}\%$ of loss

- (d) $1\frac{12}{13}\%$ loss



Sol. (a) According to question,
10 C.P = 9 S.P

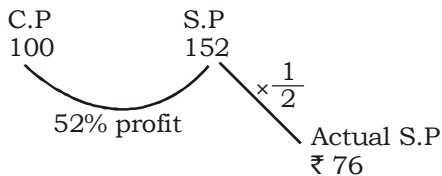
$$\frac{C.P}{S.P} = \frac{9}{10} < 1 \text{ profit}$$

$$\text{Profit}\% = \frac{1}{9} \times 100 = 11 \frac{1}{9}\%$$

11. In selling an article for ₹ 76, there is a profit of 52%. If it is sold for ₹ 75, the profit percent will be

- (a) 44 (b) 46
(c) 48 (d) 50

Sol. (d) According to question,
Let the CP = 100



$$152 \text{ units} \rightarrow ₹ 76$$

$$1 \text{ unit} \rightarrow \frac{76}{152} = \frac{1}{2}$$

$$100 \text{ units} \rightarrow \frac{1}{2} \times 100 = 50$$

$$C.P \rightarrow ₹ 50$$

$$\therefore \text{If SP} \rightarrow ₹ 75$$

$$\text{Profit}\% = \frac{25}{50} \times 100 = 50\%$$

12. The cost price of 8 articles is equal to the selling price of 9 articles. The profit or loss per cent in the transaction is

- (a) $12 \frac{1}{2}\%$ loss (b) $12 \frac{1}{2}\%$ profit
(c) $11 \frac{1}{9}\%$ loss (d) None of these

Sol. (c) According to question,
8 C.P = 9 S.P

$$\frac{C.P}{S.P} = \frac{9}{8} > 1 \text{ loss}$$

$$\text{Loss}\% = \frac{1}{9} \times 100 \Rightarrow 11 \frac{1}{9}\%$$

13. A coconut merchant finds that the cost price of 2750 coconut is the same as the selling price of 2500 coconuts. His loss or gain will be

- (a) 5% (b) 10% gain
(c) 15% loss (d) 20% gain

Sol. (b) According to question,
2750 C.P = 2500 S.P

$$\frac{C.P}{S.P} = \frac{2500}{2750} = \frac{10}{11} < 1 \text{ profit}$$

$$\text{Profit}\% = \frac{1}{10} \times 100 \Rightarrow 10\% \text{ gain}$$

14. The cost price : selling price of an article is $a : b$. If b is 200% of a then the percentage of profit on cost price is

- (a) 75% (b) 125%
(c) 100% (d) 200%

Sol. (c) CP : SP
 $a : b$

According to question,

$$b = 200\% \text{ of } a$$

$$b = \frac{200}{100} \times a$$

$$\frac{b}{a} = \frac{2}{1}$$

$$\frac{C.P}{S.P} = \frac{a}{b} = \frac{1}{2} < 1 \text{ profit}$$

$$\text{Profit}\% = \frac{1}{1} \times 100 \Rightarrow 100\%$$

15. If toys are bought at ₹ 5 each and sold at ₹ 4.50 each, then the loss is :

- (a) 10% (b) 115%
(c) 12% (d) 13%

Sol. (a) According to question,
C.P of toys = ₹ 5
S.P of toys = ₹ 4.5

$$\text{Loss} = C.P - S.P = 5 - 4.5 = 0.5$$

$$\text{Loss}\% = \frac{SP - CP}{CP} \times 100$$

$$\text{Loss}\% = \frac{0.5}{5} \times 100 = 10\%$$

16. A person sells two machines at ₹ 396 each on one machine he gains 10% and on the other he loses 10%. His profit or loss in the whole transaction is

- (a) no gain no loss
(b) 1% loss
(c) 1% profit
(d) 8% profit

Sol. Basic Method :-

According to question

First machine gain = 10%

$$\therefore S.P = 110\% \text{ of } C.P$$

$$396 = \frac{110}{100} \times C.P$$

$$C.P = \frac{396 \times 100}{110} = ₹ 360$$

For second machine = Loss = 10%

$$\therefore S.P = 90\% \text{ of } C.P$$

$$396 = \frac{90}{100} \times C.P$$

$$C.P = \frac{396 \times 100}{90} = ₹ 440$$

$$\text{Total C.P} = ₹ (360 + 440) \Rightarrow ₹ 800$$

$$\text{Total S.P} = ₹ (396 + 396) \Rightarrow ₹ 792$$

$$\text{Loss} = ₹ 8$$

$$\text{Loss}\% = \frac{8}{800} \times 100 = 1\% \text{ loss}$$

Alternate:

	Machine(1)	Machine(2)
C.P	10 $\times 9 = 90$	10 $\times 11 = 110$
S.P	11 $\times 9 = 99$	9 $\times 11 = 99$

$$\text{Total C.P} = 90 + 110 = 200$$

$$\text{Total S.P} = 99 + 99 = 198$$

$$\text{Loss} = 2$$

$$\text{Loss}\% = \frac{2}{200} \times 100 = 1\% \text{ loss}$$

17. A house and a shop were sold for ₹1 lakh each, In this transaction, the house sale resulted into 20% loss whereas the shop sale resulted into 20% profit. The entire transaction resulted in :



$$C.P : S.P$$

$$\text{Pipe I}^{\text{st}} \rightarrow 10 : 12$$

$$\text{Pipe II}^{\text{nd}} \rightarrow 15 : 12$$

$$\text{Loss} = (25-24) = 1 \text{ unit}$$

$$24 \text{ units} \rightarrow ₹ 24$$

$$1 \text{ unit} = ₹ 1$$

$$\text{Hence, Loss} = ₹ 1$$

19. A man sold two articles at ₹ 375 each on one, he gains 25% and on the other, he loses 25%. The gain or loss% on the whole transaction is

$$(a) 6\% \text{ loss} \quad (b) 4\frac{1}{6}\% \text{ profit}$$

$$(c) ₹ 50 \text{ profit} \quad (d) 6\frac{1}{4}\% \text{ loss}$$

$$\text{Sol. (d) Loss\%} = \frac{r^2}{100}$$

$$\text{Loss \%} = \frac{25 \times 25}{100} = 6\frac{1}{4}\%$$

20. By selling an article for ₹ 240. A man incurs a loss of 10%. At what price should he sell it, so that he makes a profit of 20%

$$(a) ₹ 264 \quad (b) ₹ 288$$

$$(c) ₹ 300 \quad (d) ₹ 320$$

$$\text{Sol. (d) A.T.Q}$$

$$\text{Loss} = 10\%$$

$$\Rightarrow S.P = 100 - 10 = 90\%$$

$$90\% = 240 \text{ (given)}$$

$$1\% \Rightarrow \frac{240}{90}$$

$$\text{To gain } 20\%$$

$$S.P = 100 + 20 = 120\%$$

$$120\% = \frac{240}{90} \times 120 = ₹ 320$$

Alternate method:-

$$10\% = \frac{1 \rightarrow \text{Loss}}{10 \rightarrow C.P}$$

$$S.P = 10 - 1 = 9$$

$$9 = 240 \text{ (given)}$$

$$1 \text{ units} = \frac{240}{9}$$

$$\text{To gain } 20\% = \frac{2 \rightarrow \text{gain}}{10 \rightarrow C.P}$$

$$S.P = 10 + 2 = 12$$

$$\therefore 12 \text{ units} = \frac{240}{9} \times 12 = ₹ 320$$

21. By selling an article for ₹ 72, there is a loss of 10%. In order to gain 5%, its selling price should be :

$$(a) ₹ 87 \quad (b) ₹ 85$$

$$(c) ₹ 80 \quad (d) ₹ 84$$

$$\text{Sol. (d) A.T.Q.}$$

$$10\% \text{ loss} = \frac{1 \rightarrow \text{Loss}}{10 \rightarrow C.P}$$

C.P	Loss	S.P
10	1	9
$\downarrow \times 8$		$\downarrow \times 8$
80		72

$$\text{Profit\%} = 5\%$$

$$\text{New S.P} = 80 \times \frac{105}{100} = ₹ 84$$

22. On selling an article for ₹ 105 a trader loses 9%. To gain 30% he should sell the article at

$$(a) ₹ 126 \quad (b) ₹ 144$$

$$(c) ₹ 150 \quad (d) ₹ 139$$

$$\text{Sol. (c) A.T.Q.,}$$

$$\text{For } 9\% \text{ loss} = \frac{9 \rightarrow \text{Loss}}{100 \rightarrow C.P}$$

C.P	Loss	S.P
100	9	91
		$\downarrow$
		105

for 30 profit

C.P	Profit	S.P
100	30	130

$$91 \text{ units} = 105$$

$$\therefore 1 \text{ unit} = \frac{105}{91}$$

$$\therefore 130 \text{ units} = \frac{105}{91} \times 130 = ₹ 150$$

23. An article is sold at a loss of 10%. Had it been sold for ₹ 9 more there would have been a gain of

$$12\frac{1}{2}\% \text{ on it. The cost price of the article is :}$$

$$(a) ₹ 40 \quad (b) ₹ 45$$

$$(c) ₹ 50 \quad (d) ₹ 35$$

$$(a) \text{ no loss no gain}$$

$$(b) \text{ gain of } ₹ \frac{1}{24} \text{ lakh}$$

$$(c) \text{ loss of } ₹ \frac{1}{12} \text{ lakh}$$

$$(d) \text{ loss of } ₹ \frac{1}{18} \text{ lakh}$$

$$\text{Sol. (c) } -20\% = \frac{-1}{5}, 20\% = \frac{+1}{5}$$

$$C.P : S.P$$

$$\text{House} \rightarrow 5_{\times 3} : 4_{\times 3}$$

$$\text{Shop} \rightarrow 5_{\times 2} : 6_{\times 2}$$

(To make equal S.P)

$$C.P : S.P$$

$$\text{House} \rightarrow 15 : 12$$

$$\text{Shop} \rightarrow 10 : 12$$

$$\text{Loss} = (25-24) = 1 \text{ unit.}$$

According to the questions

$$24 \text{ unit} = 2 \text{ Lakhs}$$

$$\text{Loss (1 unit)} \rightarrow \frac{1}{12} \text{ Lakhs}$$

18. A men sells two pipes at ₹ 12 each. He gains 20% on one pipe and loses 20% on the other In whole transaction, there is

$$(a) \text{ Neither loss nor gain}$$

$$(b) \text{ Profit of } ₹ 1$$

$$(c) \text{ Loss of } ₹ 1$$

$$(d) \text{ Profit of } ₹ 2$$

$$\text{Sol. (c) } -20\% = \frac{-1}{5}, 20\% = \frac{+1}{5}$$

$$C.P : S.P$$

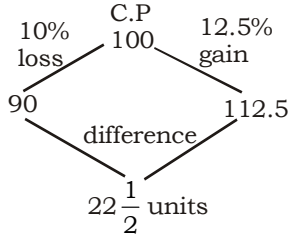
$$\text{Pipe I}^{\text{st}} \rightarrow 5_{\times 2} : 6_{\times 2}$$

$$\text{Pipe II}^{\text{nd}} \rightarrow 5_{\times 3} : 4_{\times 3}$$

(To make equal S.P)



Sol. (a) A.T.Q.,



$$22 \frac{1}{2} \text{ units} = 9$$

$$1 \text{ units} = 9 \times \frac{2}{45}$$

$$100 \text{ units} = \frac{2}{5} \times 100 = ₹ 40$$

24. By selling a table for ₹ 350 instead of ₹ 400, loss percent increased by 5%. The cost price of table is:

- (a) ₹ 1,050 (b) ₹ 417.50
(c) ₹ 435 (d) ₹ 1,000

Sol. (d) A.T.Q.,

$$\text{Difference in Price} = 400 - 350 = ₹ 50$$

$$\text{as } 5\% = ₹ 50, \quad 1\% = ₹ 10$$

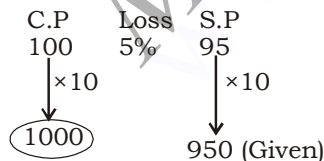
$$\text{C.P} = 100\% = 10 \times 10 = ₹ 1000$$

25. By selling a tape-recorder for ₹ 950, one lose 5% what percent shall one gain by selling it for ₹ 1040?

- (a) 5 (b) 4
(c) 4.5 (d) 9

Sol. (b) A.T.Q.,

$$5\% \text{ loss} = \frac{5 \rightarrow \text{Loss}}{100 \rightarrow \text{C.P}}$$



$$\therefore \text{C.P} = ₹ 1000, \quad \text{S.P} = ₹ 1040$$

$$\text{Profit} = ₹ 40$$

$$\text{Profit}\% = \frac{40}{1000} \times 100 = 4\%$$

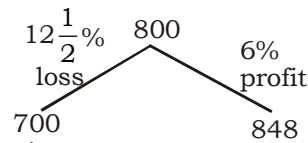
26. A shopkeeper sells an article at a loss of $12 \frac{1}{2}\%$. Had he sold it for ₹ 51.80 more, he would have earned a profit of 6%. The cost price of the article is

- (a) ₹ 280 (b) ₹ 300
(c) ₹ 380 (d) ₹ 400

Sol. (a) A.T.Q.,

$$12 \frac{1}{2}\% \text{ loss means} = \frac{1}{8}$$

$$\text{or } \frac{100 \rightarrow \text{Loss}}{800 \rightarrow \text{C.P}}$$



$$\text{difference} = 148 \text{ units}$$

$$148 \text{ units} \rightarrow 51.80$$

$$1 \text{ units} \rightarrow \frac{51.8}{148}$$

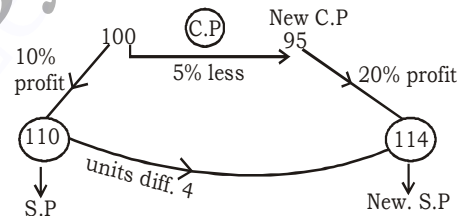
$$800 \text{ units} = \frac{51.8}{148} \times 800 = 280$$

$$\text{C.P} = ₹ 280$$

27. A person sells a table at a profit of 10%. If he had bought the table at 5% less cost and sold for ₹ 80 more. He would have gained 20%. The cost price of the table is

- (a) ₹ 3,200 (b) ₹ 2,500
(c) ₹ 2,000 (d) ₹ 200

Sol. (c) A.T.Q.,



$$4 \text{ units difference} = ₹ 80$$

(given)

$$1 \text{ units} \rightarrow 20$$

$$100 \text{ units} \rightarrow 20 \times 100 = ₹ 2000$$

$$\text{C.P of table} = ₹ 2000$$

28. A man gains 20% by selling an article for a certain price. If he sells it at double the price, the percentage of profit will be:

- (a) 40 (b) 140
(c) 100 (d) 120

Sol. (b) A.T.Q.,

$$100 (\text{C.P}) \xrightarrow{20\% \text{ gain}} 120 (\text{S.P})$$

If he sell at double the price means $\text{S.P} = 120 \times 2 = 240$

$$\text{Profit} = \frac{140}{100} \times 100 = 140\%$$

29. A radio is Sold for ₹ 990 at a profit of 10% what would have been the actual profit or loss on if had it been sold for ₹ 890 ?

- (a) ₹ 10 loss (b) ₹ 10 profit
(c) ₹ 90 loss (d) ₹ 90 profit

Sol. (a) A.T.Q.,

$$100 (\text{C.P}) \xrightarrow{10\% \text{ profit}} 110 (\text{S.P})$$

$$110 \text{ units} \rightarrow 990$$

$$\therefore 1 \text{ unit} \rightarrow 9$$

$$\therefore 100 \text{ units} \rightarrow 9 \times 100 = 900$$

$$\text{C.P} = ₹ 900$$

$$\text{Now S.P} = ₹ 890$$

$$\therefore \text{Loss} = \text{C.P} - \text{S.P} = 900 - 890 = ₹ 10 \text{ loss}$$

30. If an article is sold for ₹ 178 at a loss of 11% what should be its selling price in order to earn a profit of 11% ?

- (a) ₹ 222.50 (b) ₹ 267
(c) ₹ 222 (d) ₹ 220

Sol. (c) A.T.Q.,

$$100 (\text{C.P}) \xrightarrow{11\% \text{ loss}} 89 (\text{S.P})$$

$$89 \text{ units} \rightarrow 178$$

$$1 \text{ unit} \rightarrow 2$$

$$100 \text{ unit} \rightarrow 2 \times 100 = 200$$

$$\text{C.P} \rightarrow ₹ 200$$

to earn 11% profit

$$\text{S.P} = 200 \times \frac{111}{100} = 222$$

31. A man gets ₹ 13 more by selling an article at a profit of $12 \frac{1}{2}\%$

than selling it at a loss of $12 \frac{1}{2}\%$.

The cost price of the article is

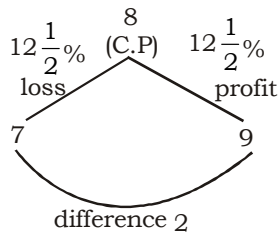
- (a) ₹ 25.50 (b) ₹ 38
(c) ₹ 52 (d) ₹ 65



Sol. (c) Let the C.P = 8 units

$$12\frac{1}{2}\% = \frac{1}{8}$$

A.T.Q.,



2 units $\rightarrow$ 13

$$1 \text{ units} \rightarrow \frac{13}{2}$$

$$8 \text{ units} \rightarrow \frac{13}{2} \times 8 = ₹ 52$$

32. The percentage of loss when an article is sold at ₹ 50 is the same as that of the profit when it is sold at ₹ 70. The above mentioned percentage of profit or loss on the article is :

- (a) 10% (b) $16\frac{2}{3}\%$
(c) 20% (d) $22\frac{2}{3}\%$

Sol. (b) Let C.P of the article = ₹ x
A.T.Q.,

$$\frac{x-50}{x} \times 100 = \frac{70-x}{x} \times 100$$

$$2x = 120$$

$$x = 60$$

$$\therefore \text{C.P} = ₹ 60$$

$$\text{S.P} = 50$$

$$\text{loss}\% = \frac{10}{60} \times 100 = \frac{100}{6}$$

$$= 16\frac{2}{3}\%$$

Alternative:-

$$\text{C.P} = \frac{50+70}{2} = 60$$

$$\text{Loss} = 60 - 50 = 10$$

$$\text{Loss}\% = \frac{10}{60} \times 100 = 16\frac{2}{3}\%$$

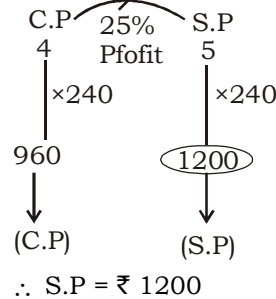
33. If a man were to sell his chair for ₹ 720, he would lose 25%. To gain 25% he should sell it for

- (a) ₹ 1,200 (b) ₹ 1,000
(c) ₹ 960 (d) ₹ 900

Sol. (a) A.T.Q.,

$$\text{C.P} = 720 \times \frac{100}{75} = 960$$

Now to gain 25%

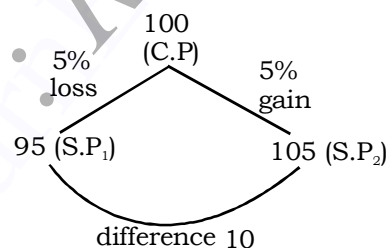


34. A man sells his typewriter at 5% loss. If he sells it for ₹ 80 more, he will gain 5%. The cost price of the typewriter is

- (a) ₹ 1,600 (b) ₹ 1,200
(c) ₹ 1,000 (d) ₹ 800

Sol. (d) Let C.P of the typewriter = 100 units

A.T.Q.,



$$10 \text{ units} = 80$$

$$1 \text{ units} = \frac{80}{10}$$

$$100 \text{ units} = \frac{80}{10} \times 100 = 800$$

$$\text{C.P of the Typewriter} = ₹ 800$$

35. An increase of ₹ 3 in the selling price of an article turns a loss

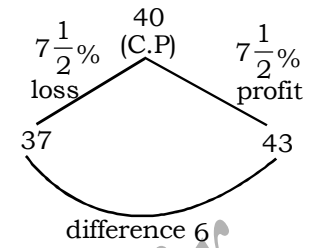
$7\frac{1}{2}\%$ into a gain of $7\frac{1}{2}\%$. The

cost price (in ₹) of the article is:

- (a) 25 (b) 20
(c) 15 (d) 10

Sol. (b) Let C.P of the article = 40 units

A.T.Q.,



$$6 \text{ units} \rightarrow ₹ 3$$

$$1 \text{ units} \rightarrow \frac{3}{6} \times 1 = \frac{1}{2}$$

$$40 \text{ units} = \frac{1}{2} \times 40 = 20$$

$$\text{C.P} = ₹ 20$$

36. A businessman sells a commodity at 10% profit. If he had bought it at 10% less and sold it for ₹ 2 less, then he would

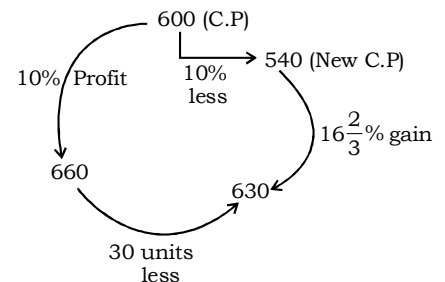
have gained $16\frac{2}{3}\%$. The cost

price of the commodity is

- (a) ₹ 32 (b) ₹ 36
(c) ₹ 40 (d) ₹ 48

Sol. (c) Let C.P of the commodity = 600 units

A.T.Q.,



$$30 \text{ units} \rightarrow ₹ 2$$

$$1 \text{ units} \rightarrow \frac{2}{30}$$

$$600 \text{ units} \rightarrow \frac{2}{30} \times 600 = 40$$

$$\text{C.P of the commodity} = ₹ 40$$

37. If the selling price of an article is doubled, then its loss percent is converted into equal profit percent. The loss percent on the article is

- (a) $26\frac{2}{3}\%$ (b) 33%
(c) $33\frac{1}{3}\%$ (d) 34%



Sol. (c) Let S.P = ₹ x

A.T.Q.,

$$\left(\frac{C.P - x}{C.P}\right) \times 100 = \left(\frac{2x - C.P}{C.P}\right) \times 100$$

$$C.P - x = 2x - C.P$$

$$3x = 2 C.P$$

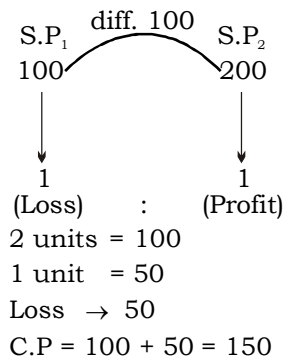
$$x = \frac{2}{3} C.P$$

$$S.P = \frac{2}{3} C.P$$

$$\frac{S.P}{C.P} = \frac{2}{3} > 1 \text{ units loss}$$

$$\text{loss}\% = \frac{1}{3} \times 100 = 33\frac{1}{3}\%$$

Alternate :-



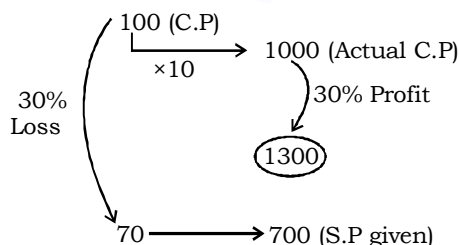
$$\text{Loss}\% = \frac{50}{150} \times 100 = 33\frac{1}{3}\%$$

38. By selling an article for ₹ 700 a man lost 30%. At what price should he have sold it to gain 30%?

- (a) ₹ 910 (b) ₹ 1200
(c) ₹ 1232 (d) ₹ 1300

Sol. (d) Let the C.P of the article = 100 units

A.T.Q.,



$$70 \text{ units} = 700$$

$$1 \text{ units} = \frac{700}{70} = 10$$

$$100 \text{ units} = 10 \times 100 = 1000$$

$$C.P = ₹ 1000$$

To gain 30%

$$S.P = 1000 \times \frac{130}{100} \Rightarrow 1300$$

39. A man purchased a bed sheet for ₹ 450 and sold it at a gain of 10% calculated on the selling price. The selling price of the bed sheet was

- (a) ₹ 460 (b) ₹ 475
(c) ₹ 480 (d) ₹ 500

Sol. (d) A.T.Q.,

$$C.P \text{ of the bed sheet} = ₹ 450$$

$$\text{Profit} = 10\% \text{ on } S.P = \frac{1 \rightarrow \text{Profit}}{10 \rightarrow S.P}$$

$$\therefore C.P = S.P - \text{Profit}$$

$$C.P = 10 - 1 = 9 \text{ units}$$

$$9 \text{ units} = 450$$

$$1 \text{ unit} = 50$$

$$10 \text{ units} = 10 \times 50 = 500$$

$$\therefore S.P = ₹ 500$$

40. If an article is sold at 200% profit then the ratio of its cost price to its selling price will be

- (a) 1 : 2 (b) 2 : 1
(c) 1 : 3 (d) 3 : 1

Sol. (c) Let the C.P of the article = ₹ 100

A.T.Q.,

$$100 \text{ (C.P)} \xrightarrow{200\% \text{ Profit}} 300 \text{ (S.P)}$$

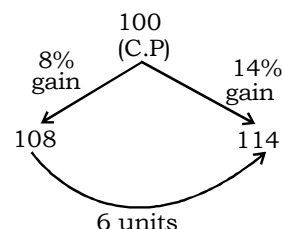
$$\text{Ratio of } \frac{C.P}{S.P} = \frac{100}{300} = 1 : 3$$

41. Seema sold a bicycle at a gain of 8%. Had it been sold for ₹ 75 more, The gain would have been 14%. The cost price of the bicycle was

- (a) ₹ 1200 (b) ₹ 1250
(c) ₹ 1350 (d) ₹ 1500

Sol. (b) Let the C.P of bicycle is = 100 units

A.T.Q.,



$$6 \text{ units} = ₹ 75$$

$$1 \text{ units} = \frac{75}{6}$$

$$100 \text{ units} = \frac{75}{6} \times 100 = ₹ 1250$$

$$\therefore C.P \text{ of bicycle} = ₹ 1250$$

42. 12 copies of a book were sold for ₹ 1800 there by gaining cost price of 3 copies. The cost price of a copy is:-

- (a) ₹ 120 (b) ₹ 150
(c) ₹ 1200 (d) ₹ 1500

Sol. (a) Let the cost price of 1 book be x

$$\therefore \text{cost price of 3 books} = 3x$$

$$\text{and cost price of 12 books} = 12x$$

$$\text{selling price of 12 books} = 1800$$

$$= 12x + 3x = 15x$$

$$\Rightarrow 15x = 1800$$

$$\therefore x = \frac{1800}{15} = 120$$

$$\text{The cost price of each book} = ₹ 120$$

Alternate:-

According to question

$$S.P \text{ of one Book} = \frac{1800}{12} = 150$$

$$12 S.P - 12 C.P = 3 C.P$$

$$12 S.P = 15 C.P$$

$$\frac{S.P}{5} : \frac{C.P}{4}$$

$$\text{Now, } 5 \text{ Unit} \rightarrow 150$$

$$1 \text{ Unit} \rightarrow 30$$

$$\text{Cost Price of each book} = 4 \text{ units}$$

$$= 4 \times 30 = ₹ 120$$

43. On selling 17 balls at ₹ 720, there is a loss equal to the cost price of 5 balls. The cost price of a ball is ₹

- (a) 45 (b) 50
(c) 60 (d) 55

Sol. (c) Let the C.P of each ball = x

Then,

$$\text{clearly the cost price of } (17-5)x \text{ balls} = ₹ 720$$

$$\text{i.e., } 12x = 720$$

$$x = 60$$

**Alternate:-**

$$17 \text{ C.P} - 17 \text{ S.P} = 5 \text{ C.P}$$

$$12 \text{ C.P} = 17 \text{ S.P}$$

$$\frac{\text{C.P}}{17} : \frac{\text{S.P}}{12}$$

$$\text{S.P of one Balls} = \frac{720}{17}$$

$$\text{Now, 12 unit} = \frac{720}{17}$$

$$1 \text{ unit} = \frac{60}{17}$$

$$\text{C.P of one Ball} = 17 \text{ units}$$

$$= 17 \times \frac{60}{17} = 60$$

44. Nishat bought 25 books for ₹ 2000 and sell them at a profit equal to the selling price of 5 books. The selling price of 1 book is

- (a) ₹ 100 (b) ₹ 120
(c) ₹ 150 (d) ₹ 200

Sol. (a) Let the S.P of 1 book = x

$$\therefore \text{S.P of 25 books} = 25x$$

A.T.Q.,

$$25x - 2000 = 5x$$

$$\Rightarrow 20x = 2000$$

$$x = 100$$

$$\therefore \text{S.P of 1 book} = ₹ 100$$

Alternate:-

$$\text{C.P of one Book} = \frac{2000}{25} = 80$$

According to the question

$$25 \text{ S.P} - 25 \text{ C.P} = 5 \text{ S.P}$$

$$20 \text{ S.P} = 25 \text{ C.P}$$

$$\frac{\text{S.P}}{5} : \frac{\text{C.P}}{4}$$

$$4 \text{ Units} \rightarrow 80$$

$$1 \text{ Unit} \rightarrow 20$$

$$\text{S.P of one Book} = 5 \text{ Units}$$

$$= 5 \times 20 = ₹ 100$$

45. An item costing ₹ 200 is being sold at 10% loss. If the price is further reduced by 5%, the selling price will be ₹

(a) 170 (b) 171

(c) 175 (d) 179

Sol. (b) First S.P of article

$$= \frac{200 \times 90}{100} = ₹ 180$$

After decrease of 5%

$$\text{S.P} = \frac{180 \times 95}{100} = ₹ 171$$

46. A man sold his watch at a loss of 5%. had he sold it for ₹ 56.25 more, he would have gained 10% what is the cost price of the watch (in ₹)

(a) 370 (b) 365

(c) 375 (d) 390

Sol. (c) C.P of watch = ₹ x (let)

$$\therefore \text{S.P of watch} = \frac{x \times 95}{100} = \frac{19x}{20}$$

Case II,

$$\text{S.P} = ₹ \left(\frac{19x}{20} + 56.25 \right)$$

$$\text{Profit percent} = 10\%$$

$$\therefore \frac{x \times 110}{100} = \frac{19x}{20} + 56.25$$

$$\Rightarrow \frac{11x}{10} - \frac{19x}{20} = 56.25$$

$$\Rightarrow 3x = 56.25 \times 20$$

$$\Rightarrow x = \frac{56.25 \times 20}{3} = ₹ 375$$

Alternate:-

	C.P	C.P	
I st Case	100	95	Diff =
II nd Case	100	110	Rs 56.25
15 Units =	56.25		

$$\text{CP} \Rightarrow 100 \text{ Units} = \frac{56.25 \times 100}{15} = ₹ 375$$

47. Nishant bought a cycle for 1650. He had to sell it a loss of 8%. He sold it for (in ₹)

(a) 1581 (b) 1518

(c) 1510 (d) 1508

Sol. (b) C.P of cycle = ₹ 1650

$$\text{Loss} = 8\%$$

$$\therefore \text{S.P. of cycle} = \left(\frac{100 - \text{loss}\%}{100} \right) \times \text{C.P.}$$

$$= \frac{92 \times 1650}{100} = ₹ 1518$$

Alternate:-

$$8\% = \frac{2}{25} \quad \text{CP : SP} \\ 25 : 23$$

$$\text{Selling Price} = 1650 \times \frac{23}{25} \\ = ₹ 1518$$

48. A table is sold at ₹ 1800 at a loss of 10%. At what price should it be sold to earn a profit of 15%?

(a) ₹ 2070 (b) ₹ 1890

(c) ₹ 2000 (d) ₹ 2300

Sol. (d) C.P of table = ₹ x (let)

A.T.Q.,

$$\frac{x \times 90}{100} = 1800$$

$$\Rightarrow x = \frac{1800 \times 100}{90} = ₹ 2000$$

For a profit of 15%,

$$\text{S.P} = \frac{2000 \times 115}{100} = ₹ 2300$$

Alternate:-

	C.P	S.P	
I st Case	100	90	→ Rs. 1800
II nd Case	100	115	
90 Units =	1800		

$$115 \text{ Units} = \frac{1800 \times 115}{90} = ₹ 2300$$

49. A manufacturer sells an item to a wholesale dealer at a profit of 18%. The wholesaler sells the same to a retailer at a profit of 20%. The retailer sells it to a customer for ₹ 15045 by earning a profit of 25%. The cost price of the manufacturer is (in ₹)

(a) 8000 (b) 8500

(c) 9000 (d) 10,000

Sol. (b) Cost price for the manufacturer

$$= ₹ x \text{ (let)}$$

$$\therefore x \times \frac{118}{100} \times \frac{120}{100} \times \frac{125}{100} = 15045$$

$$\Rightarrow x = \frac{15045 \times 1000000}{118 \times 120 \times 125}$$

$$= ₹ 8500$$

**Alternate:-**

Manu	W.S	Reta	Customer
50	59	59	59
5	5	6	6
4	4	4	5
1000			1770

$$1770 \text{ units} = 15045$$

$$\therefore 1 \text{ unit} = \frac{15045}{1770}$$

$$\therefore 1000 \text{ units} = \frac{15045}{1770} \times 1000 = ₹ 8500$$

50. A man sold an article at a gain of 5%. Had he sold it for ₹ 240 more, he would have gained 8%. The cost price of article is (in ₹)-

- (a) 6000 (b) 10000
(c) 12000 (d) 8000

Sol. (d) Let C.P of article = x

A.T.Q.,

$$108 \text{ of } x - 105 \text{ of } x = 240$$

$$\frac{108x}{100} - \frac{105x}{100} = 240$$

$$3x = 24000$$

$$x = 8000$$

Note:- In original question it is ₹240**Alternate:-**

C.P	I st Case	II nd Case
100	105	108
	8% profit	5% profit
	Diff = Rs. 240	

$$3 \text{ units} = 240$$

$$100 \text{ units} = \frac{240 \times 100}{3} = 8000$$

51. A radio is sold at a profit of 20%. Had it been sold for ₹ 60 more the profit would have been 30%. The cost price of the radio is

- (a) ₹ 500 (b) ₹ 600
(c) ₹ 550 (d) ₹ 620

Sol. (b) C.P of radio = ₹ x (let)

A.T.Q.,

$$\frac{130x}{100} - \frac{120x}{100} = 60$$

$$\frac{10x}{100} = 60$$

$$10x = 6000$$

$$x = 600$$

Alternate:-

C.P	I st Case	II nd Case
100	120	130

$$\text{Diff} = 10$$

$$10 \text{ Units} = 60$$

$$100 \text{ Units} = \frac{60 \times 100}{10} = ₹ 600$$

52. The prices of a refrigerator and a television set are in the ratio 5 : 3. If the refrigerator costs ₹ 5500 more than the television set, then the price of the refrigerator is

- (a) 13000 (b) 12350
(c) 13750 (d) 12000

Sol. (c) C.P of refrigerator = ₹ $5x$

$$\text{C.P of television} = ₹ 3x$$

$$\therefore 2x = 5500$$

$$\Rightarrow x = \frac{5500}{2} = 2750$$

$$\therefore \text{C.P of refrigerator} = 5 \times 2750 = ₹ 13750$$

Alternate:-

Ref	Tel
5	3
	Diff = 2

$$2 \text{ Units} = 5500$$

$$5 \text{ Units} = \frac{5500 \times 5}{2} = 13750$$

53. The costs of two watches were in the ratio 16 : 23. The cost of first watch increases by 10% and that of second by ₹ 477. Now the costs of two watches are in ratio of 11:20. The price of the second watch (in ₹) in the beginning was

- (a) 932 (b) 1219
(c) 1696 (d) 848

Sol. (b) C.P of first watch = ₹ $16x$

$$\text{C.P of second watch} = ₹ 23x$$

According to the question,
Ratio after corresponding

$$\text{increases} = \frac{11}{20}$$

$$\Rightarrow \frac{\frac{16x \times 110}{100}}{23x + 477} = \frac{11}{20}$$

$$\Rightarrow \frac{1760x}{100(23x + 477)} = \frac{11}{20}$$

$$\Rightarrow \frac{160x}{5(23x + 477)} = 1$$

$$\Rightarrow 160x = 115x + 2385$$

$$\Rightarrow 45x = 2385 \Rightarrow x = \frac{2385}{45} = 53$$

$$\therefore \text{original C.P of second watch} = ₹ 23x$$

$$= ₹ (23 \times 53) = ₹ 1219$$

Alternate:-

	I	II
C.P I st	16	23
	↓ +10%	↓
C.P II nd	17.6	23
	176	230
But Ratio is 16x	176	320

diff (Units)
= 447

$$90 \text{ Units} = 477$$

$$230 \text{ Units} = \frac{477 \times 230}{90} = ₹ 1219$$

54. Find the selling price of an article if a shopkeeper allows two successive discounts of 5% each on the marked price of ₹ 80.

- (a) ₹ 70.20 (b) ₹ 70.10
(c) ₹ 72.00 (d) ₹ 72.20

Sol. (d) The S.P after the first discount of 5% on ₹ 80

$$= ₹ \left(80 - \frac{5 \times 80}{100} \right)$$

$$₹ (80 - 4) = ₹ 76$$

Again, after 5% discount on ₹ 76.

$$\text{S.P. } ₹ \left(76 - \frac{5 \times 76}{100} \right)$$

$$= ₹ (76 - 3.80) = ₹ (72.20)$$

Alternate:-

M.P	S.P
I st 20 : 19	
II nd 20 : 19	
	400 : 361

$$400 \text{ Units} = 80$$

$$361 \text{ Units} = \frac{80 \times 361}{400} = ₹ 72.20$$



55. By selling an article for ₹ 72, there is a loss of 10%. In order to gain 5%, its selling price should be

(a) ₹ 87 (b) ₹ 85
(c) ₹ 80 (d) ₹ 84

Sol. (d) C.P. of that article

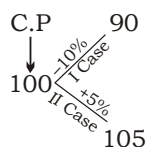
$$= 72 \times \frac{100}{100 - 10}$$

$$= \frac{72 \times 100}{90} = ₹ 80$$

∴ S.P. of that article on 5% gain

$$= 80 \times \frac{105}{100} = ₹ 84.$$

Alternate:-



$$90 \text{ Units} = 72$$

$$105 \text{ Units} = \frac{72 \times 105}{90} = ₹ 84$$

56. A man sells a car to his friend at 10% loss. If the friend sells it for ₹ 54,000 and gains 20%, the original price of the car was?

(a) ₹ 25000 (b) ₹ 35000
(c) ₹ 45000 (d) ₹ 50000

Sol. (d) Initial C.P. of the car = ₹ x , then

$$\therefore \text{First S.P.} = \frac{9x}{10}$$

$$\therefore \frac{9x}{10} \times \frac{120}{100} = 54000$$

$$\Rightarrow x = \frac{54000 \times 1000}{9 \times 120}$$

$$\Rightarrow x = ₹ 50,000$$

Alternate:-

Man Friend Other Person

$$\times \begin{bmatrix} 10 \\ 5 \end{bmatrix} \leftarrow \begin{bmatrix} 9 \\ 5 \end{bmatrix} \times \rightarrow \begin{bmatrix} 9 \\ 6 \end{bmatrix} \times$$

$$50 : 45 : 54$$

$$54 \text{ Units} = 54000$$

$$50 \text{ Units} = \frac{54000 \times 50}{54} = ₹ 50000$$

57. A shopkeeper sold sarees at ₹266 each after giving 5% discount on labelled price. Had he not given the discount, he would have earned a profit of 12% on the cost price. What was the cost price of each saree?

(a) ₹ 280 (b) ₹ 260
(c) ₹ 240 (d) ₹ 250

Sol. (d) Let C.P. of sari = ₹ x

$$\text{Marked price} = \left(\frac{112x}{100} \right)$$

$$\therefore \frac{95}{100} \times \frac{112x}{100} = 266$$

$$\Rightarrow x = \frac{266 \times 100 \times 100}{95 \times 112} = ₹ 250.$$

Alternate:-

After dis. of 5% = 266

$$\text{S.P.} \rightarrow \frac{19}{20}$$

$$\text{M.P.} \rightarrow \frac{20}{19}$$

$$19 \text{ Units} = 266$$

$$20 = \frac{266 \times 20}{19}$$

$$\text{M.P.} = 280 = \text{S.P.}$$

After profit of 12%

$$\text{M.P.} = \text{S.P.} \rightarrow \frac{28}{25} \rightarrow 280$$

$$\text{C.P.} \rightarrow \frac{25}{28} \rightarrow \text{250}$$

58. A shopkeeper offers a discount of 10% on his articles. The marked price of the article is ₹ 450. The selling price should be

(a) ₹ 395 (b) ₹ 410
(c) ₹ 405 (d) ₹ 400

Sol. (c) C.P. of article

$$= \frac{450 \times 90}{100} = ₹ (45 \times 9) = ₹ 405.$$

Alternate:-

M.P. S.P

$$10 : 9$$

$$10 \text{ Units} = 450$$

$$9 \text{ Units} = \frac{450 \times 9}{10} = ₹ 405$$

59. Profit after selling a commodity for ₹ 524 is the same as loss after selling it for ₹ 452. The cost price of the commodity is..

(a) ₹ 480 (b) ₹ 500
(c) ₹ 488 (d) ₹ 485

$$\begin{array}{ccc} \text{Sol. (c)} & \text{S.P}_1 & \text{C.P} & \text{S.P}_2 \\ & 524 & & 452 \\ & \text{---} & \text{---} & \\ & x & -x & \\ & (\text{Profit}) & (\text{Loss}) & \end{array}$$

$$\text{Then } 2x = 524 - 452 = 72$$

$$x = 36$$

$$\text{Then cost Price} = 524 - 36 = ₹ 488$$

60. A clock was sold for ₹ 144. If the percentage of profit was numerically equal to the cost price, the cost of the clock was

(a) ₹ 72 (b) ₹ 80
(c) ₹ 90 (d) ₹ 100

Sol. (b) Let the cost price be 'x'

$$\therefore (100+x)\% \text{ of } x = 144$$

$$(100+x)x = 14400$$

$$x^2 + 100x - 14400 = 0$$

$$x^2 + 180x - 80x - 14400 = 0$$

$$x(x+180) - 80(x+180) = 0$$

$$(x+180)(x-80) = 0$$

$$x = ₹ 80 \text{ (} x \neq -180 \text{)}$$

Alternate:

To save your valuable time, go through option.

option(b)

$$\text{C.P.} = 80$$

$$\text{P\%} = 80\%$$

$$\therefore \text{S.P.} = 80 \times \frac{180}{100} = 144$$

Which is equal to SP given in question.

61. If the profit on selling an article for ₹ 425 is the same as the loss on selling it for ₹ 355, then the cost price of the article is

(a) ₹ 370 (b) ₹ 380
(c) ₹ 390 (d) ₹ 400

Sol. (c) Let the C.P. of article be x , then, $425 - x = x - 355$

$$\Rightarrow 2x = 425 + 355 = 780$$

$$x = \frac{780}{2} = ₹ 390.$$



62. A man sells an article at a loss of 10%. If he had sold it for ₹ 10 more, he would have gained 10%. The cost price of that article.

- (a) ₹ 50 (b) ₹ 55
(c) ₹ 100 (d) ₹ 110

Sol. (a) Let the C.P. of ₹ x
First selling price = 90% of x
 $= \frac{90x}{100} = \frac{9x}{10}$

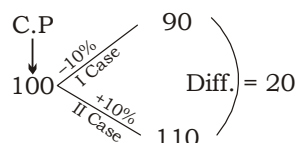
$$\text{Second selling price} = \left(\frac{9x}{10} + 10 \right)$$

$$\therefore 110\% \text{ of } x = \left(\frac{9x}{10} + 10 \right)$$

$$\frac{11x}{10} = \frac{9x}{10} + 10 \Rightarrow \frac{2x}{10} = 10$$

$$\Rightarrow x = \frac{10 \times 10}{2} = ₹ 50$$

Alternate:-



$$20 \text{ Units} = 10$$

$$100 \text{ Units} = \frac{10 \times 100}{20} = 50$$

63. A businessman sells a commodity at 10% profit. If he had bought it at 10% less and sold it for ₹ 2 less, then he would have gained

$16\frac{2}{3}\%$. The cost price of the commodity is

- (a) ₹ 32 (b) ₹ 36
(c) ₹ 40 (d) ₹ 48

Sol. (c) Let the first C.P. of the commodity be ₹ 100.

$$\therefore \text{First SP} = ₹ 110$$

$$\text{Second CP} = ₹ 90$$

$$\text{Gain}\% = \frac{50}{3}\%$$

$$\therefore \text{Second S.P.} = \left(100 + \frac{50}{3} \right)\% \text{ of } 90$$

$$= ₹ \left(90 \times \frac{350}{300} \right) = 105$$

$$\text{Difference of first and second S.P.} = ₹ (110 - 105) = ₹ 5$$

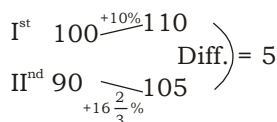
$\therefore$ If the difference is ₹ 5,
the CP = ₹ 100

$\therefore$ If the difference is ₹ 2,

$$\text{the CP} = \frac{100}{5} \times 2 = ₹ 40$$

Alternate:-

C.P



$$5 \text{ Units} = 2$$

$$100 \text{ Units} = \frac{2 \times 100}{5} = ₹ 40$$

64. A cooker is sold at a gain of 16%, if it has been sold for ₹ 20 more, 20% would have been gained. The cost price of the cooker is.

- (a) ₹ 350 (b) ₹ 400
(c) ₹ 500 (d) ₹ 600

Sol. (c) Let the C.P. of the cooker be ₹ x

$$\therefore \text{Initial S.P.} = \frac{116x}{100}$$

$$\text{Again, S.P.} = \frac{116x}{100} + 20$$

$$\therefore \frac{116x}{100} + 20 = \frac{120x}{100}$$

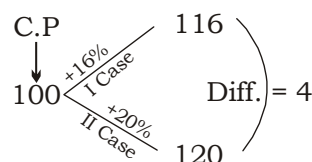
$$\Rightarrow 116x + 2000 = 120x$$

$$\Rightarrow 4x = 2000$$

$$\Rightarrow x = \frac{2000}{4}$$

$$\Rightarrow x = ₹ 500$$

Alternate:-



$$4 \text{ Units} = 20$$

$$100 \text{ Units} = \frac{20 \times 100}{4} = ₹ 500$$

65. When an article is sold at a gain of 20%, it yields ₹ 60 more than when it is sold at a loss of 20%. The cost price of the article is

- (a) ₹ 200 (b) ₹ 150
(c) ₹ 140 (d) ₹ 120

Sol. (b) Let the CP of article be 'x'

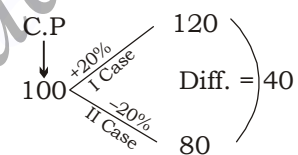
$$\therefore \frac{120x}{100} - \frac{80x}{100} = 60$$

$$\Rightarrow 40x = 60 \times 100$$

$$x = \frac{60 \times 100}{40}$$

$$x = ₹ 150$$

Alternate:-



$$40 \text{ Units} = 60$$

$$100 \text{ Units} = \frac{60 \times 100}{40} = 150$$

66. A book vendor sold a book at a loss of 20%. Had he sold it for ₹ 108 more, he would have earned a profit of 30%. Find the cost price of the book?

- (a) ₹ 216 (b) ₹ 648
(c) ₹ 240 (d) ₹ 432

Sol. (a) If the cost price of the book be ₹ x , then

$$\therefore \frac{x \times 80}{100} + 108 = \frac{x \times 130}{100}$$

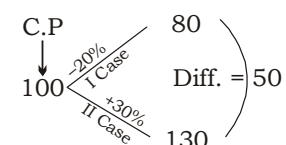
$$\Rightarrow \frac{5x}{10} = 108$$

$$5x = 1080$$

$$x = \frac{1080}{5}$$

$$x = ₹ 216$$

Alternate:-



$$50 \text{ Units} = 108$$

$$100 \text{ Units} = \frac{108 \times 100}{50} = 216$$



67. An article is sold at a gain of 15%. Had it been sold for ₹ 27 more, the profit would have been 20%. The cost price of the article is
- (a) ₹ 500 (b) ₹ 700
(c) ₹ 540 (d) ₹ 545

Sol. (c) Let the CP of article be ₹ x
Then

$$\frac{120x}{100} - \frac{115x}{100} = 27$$

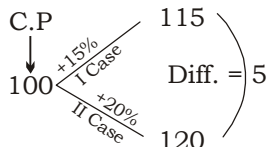
$$\frac{5x}{100} = 27$$

$$5x = 2700$$

$$x = \frac{2700}{5}$$

$$x = ₹ 540$$

Alternate:-



$$5 \text{ Units} = 27$$

$$100 \text{ Units} = \frac{27 \times 100}{5} = 540$$

68. A man sells an article at a gain of 15%. If he had bought it for 10% less and sold it for ₹ 4 less, he would have gained 25%. The cost price of article is

- (a) ₹ 140 (b) ₹ 150
(c) ₹ 160 (d) ₹ 185

Sol. (c) CP of article be ₹ x

SP at 15% gain

$$= \frac{115x}{100} = \frac{23x}{20}$$

$$\text{New CP} = ₹ \frac{90x}{100}$$

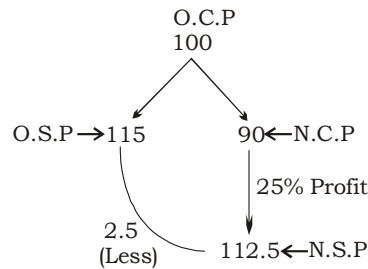
$$\text{New SP} = ₹ \frac{90x}{100} \times \frac{125}{100} = ₹ \frac{9x}{8}$$

$$\therefore \frac{23x}{20} - \frac{9x}{8} = 4$$

$$\frac{46x - 45x}{40} = 4 \Rightarrow x = 40 \times 4$$

$$x = ₹ 160$$

Alternate:-



$$2.5 \text{ units} = 4$$

$$1 \text{ unit} = \frac{4}{2.5}$$

$$\text{C.P.} = \frac{4}{2.5} \times 100 = ₹ 160$$

69. An article was sold at 16% gain. had it been sold for ₹ 200 more, the gain would have been 20%. Then the cost price of the article is

- (a) ₹ 5000 (b) ₹ 4800
(c) ₹ 4500 (d) ₹ 5200

Sol. (a) If the CP of article be ₹ x , then

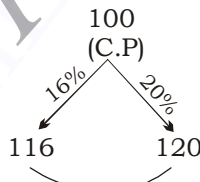
$$\frac{x \times 116}{100} + 200 = \frac{x \times 120}{100}$$

$$\Rightarrow x \times \frac{4}{100} = 200$$

$$\Rightarrow x = \frac{200 \times 100}{4}$$

$$x = ₹ 5000$$

Alternate:-



$$4 \text{ Units} = 200$$

$$1 \text{ Unit} = 50$$

$$\text{Now, C.P.} = 100 \times 50 = 5000$$

70. If an article is sold at a gain of 5% instead of being sold at a loss of 5%, one gets ₹ 5 more. What is the cost price of the article?

- (a) ₹ 100 (b) ₹ 105
(c) ₹ 50 (d) ₹ 110

Sol. (c) Let the c.p. of article = x
According to the question,

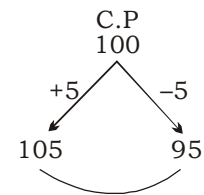
$$\frac{105x}{100} - \frac{95x}{100} = 5$$

$$105x - 95x = 500$$

$$10x = 500$$

$$x = ₹ 50$$

Alternate:-



$$10 \text{ Unit} = 5$$

$$1 \text{ Unit} = \frac{5}{2}$$

Now,

$$\text{C.P. of Article} = 100 \times \frac{1}{2} = 50$$

71. One trader calculates the percentage of profit on the buying price and another calculates on selling price. When their selling prices are the same, then the difference of their actual profit is ₹ 85 and both claim to have made 20% profit. What is the selling price of each?

- (a) ₹ 1700 (b) ₹ 2100
(c) ₹ 2550 (d) ₹ 2750

Sol. (c) For the first trader, Let the C.P. be 100

$$\therefore \text{SP} = ₹ 120$$

For the second trader, SP of the article be ₹ 120

$$\text{gain \%} = 20$$

Let the cp be x

$$\therefore \frac{120 - x}{120} \times 100 = 20$$

$$\Rightarrow 120 - x = 20 \times \frac{6}{5} = 24$$

$$\Rightarrow x = 120 - 24 = ₹ 96$$

$$\therefore \text{gain} = ₹ 24$$

$$\text{Difference of gain} = 24 - 20 = ₹ 4$$

$$\therefore \text{If the difference of gains be ₹ 4, then sp} = ₹ 120$$

$$\therefore \text{when the difference be ₹ 85}$$

$$\therefore \text{sp} = \frac{120}{4} \times 85 = ₹ 2250$$

Alternate:-

Ist Case

20% Profit on C.P

$$\frac{20}{100} = \frac{1}{5} \leftarrow \text{Profit}$$

$$\frac{100}{100} = 1 \leftarrow \text{C.P}$$

$$\text{S.P} = 6$$

$$\frac{\text{C.P}}{\text{S.P}} = \frac{5}{6}$$

**Find Case**

20% Profit on S.P

$$\frac{20}{100} = \frac{1}{5} \leftarrow \text{Profit}$$

C.P = 4

$$\frac{\text{C.P}}{\text{S.P}} = \frac{4}{5}$$

Now S.P of articles are same then

$$\frac{\text{C.P}}{\text{S.P}} = \frac{5 \times 5}{6 \times 5} = \frac{25}{30} \quad (1\text{st case})$$

$$\frac{\text{C.P}}{\text{S.P}} = \frac{4 \times 6}{5 \times 6} = \frac{24}{30} \quad (2\text{nd case})$$

Difference of their C.P

$$25 - 24 = 1$$

$$1 \rightarrow 85$$

$$\text{Then, S.P} = 85 \times 30 = 2550$$

72. A person sold a TV for 9,400 and he lost a particular amount. When he sold another TV of the same type at ₹ 10,600, his gain was double the former loss. What was the cost price of each TV?

- (a) ₹ 9800 (b) ₹ 10000
(c) ₹ 10200 (d) ₹ 10400

Sol. (a) Let cp of each TV be x .

According to the questions,

$$\Rightarrow 2(x - 9400) = 10600 - x$$

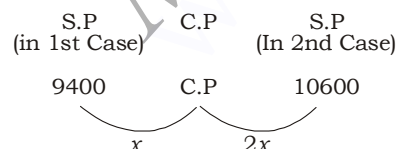
$$\Rightarrow 2x - 18800 = 10600 - x$$

$$\Rightarrow 3x = 10600 + 18800$$

$$\Rightarrow 3x = 29400$$

$$\Rightarrow x = \frac{29400}{3}$$

$$\therefore x = ₹ 9800$$

Alternate:-Let he has loss by ' x '

$$\text{Then } 3x = 10600 - 9400$$

$$x = \frac{1200}{3} = 400$$

$$\text{Then C.P} = 9400 + 400 = 9800$$

73. By selling a bicycle for ₹ 2850, a shopkeeper gain 14%. If the profit is reduced to 8%, then the selling price will be

- (a) ₹ 2600 (b) ₹ 2700
(c) ₹ 2800 (d) ₹ 3000

Sol. (b) **Tricky Approach**

C.P. of bicycle

$$= \frac{100}{114} \times 2850 = ₹ 2500$$

S.P. for a profit of 8%

$$= \frac{108}{100} \times 2500 = ₹ 2700$$

74. The percentage of profit, when an article is sold for ₹ 78, is twice than when it is sold for ₹ 69. The cost price of the article is:

- (a) ₹ 49 (b) ₹ 51
(c) ₹ 57 (d) ₹ 60

Sol. (d) Let the c.p of the article be x .

$$\text{Then, } \left(\frac{78 - x}{x} \right) \times 100$$

$$= 2 \times \left(\frac{69 - x}{x} \right) \times 100$$

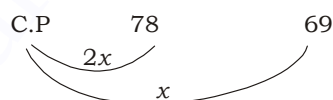
$$\Rightarrow 78 - x = 2 \times 69 - 2x$$

$$\Rightarrow 2x - x = 138 - 78$$

$$x = ₹ 60$$

Alternate:-Let profit in 2nd case is x

C.P	S.P	S.P
(In 1st Case)	(In 2nd Case)	



$$\text{Then } 2x - x = 78 - 69$$

$$x = 9$$

$$\text{C.P} = 69 - x = 69 - 9 = 60$$

75. A loss of 19% gets converted into a profit of 17% when the selling price is increased by ₹ 162. The cost price of the article is

- (a) ₹ 450 (b) ₹ 600
(c) ₹ 360 (d) ₹ 540

Sol. (a) If the C.P. of article be x , then

$$\frac{117x}{100} - \frac{81x}{100} = 162$$

$$\frac{36x}{100} = 162$$

$$x = \frac{162 \times 100}{36} = ₹ 450$$

Alternate:-

$$17 - (-19) = 36$$

$\downarrow$ $\downarrow$
 Profit Loss

$$\text{Then } 36\% = 162$$

$$1\% = \frac{9}{2}$$

$$\text{Then C.P} = \frac{9}{2} \times 100 = 450$$

76. A shopkeeper bought 200 articles, each costing the same. He sold 30% of the articles at 20% profit and remaining at 10% profit. If the total profit made by him is ₹ 2600, find the cost price of one article?

- (a) ₹ 200 (b) ₹ 1300
(c) ₹ 2600 (d) ₹ 100

Sol. (d) C.P. of each article = ₹ 1

$$\therefore \text{Total C.P.} = ₹ 200$$

$$\text{Total S.P.} = \frac{60 \times 120}{100} + \frac{140 \times 110}{100}$$

$$= 72 + 154 = ₹ 226$$

$$\text{gain} = 226 - 200 = 26$$

$$\text{when gain} = ₹ 26, \text{ c.p.} = ₹ 1$$

$$\text{when gain} = ₹ 2600$$

$$\text{C.P} = ₹ 100$$

77. Sim on purchased a bicycle for 6810. He had paid a VAT for 113.5%. The list price of the bicycle was

- (a) ₹ 6000 (b) ₹ 6140
(c) ₹ 6696.50 (d) ₹ 5970.50

Sol. (a) Marked price of bicycle = ₹ x (let)

According to the question,

$$x \times 113.5\% = 6810$$

$$\frac{x \times 113.5}{100} = 6810$$

$$x = \frac{6810 \times 100}{113.5}$$

$$x = ₹ 6000$$

78. A man sells an article at 5% above its cost price. If he had bought it at 5% less than what he had paid for it and sold it at ₹ 2 less, he would have gained 10%. The cost price of the article is

- (a) ₹ 200 (b) ₹ 400
(c) ₹ 300 (d) ₹ 100



Sol. (b) C.P. of article = ₹ x (let)

S.P. at 5% profit

$$= ₹ \left(\frac{105x}{100} \right) = ₹ \left(\frac{21x}{20} \right)$$

$$\text{New C.P. of article} = \frac{95x}{100} = ₹ \frac{19x}{20}$$

$$\text{S.P.} = ₹ \left(\frac{19x}{20} \times \frac{110}{100} \right)$$

$$= ₹ \left(\frac{209x}{200} \right)$$

According to the question,

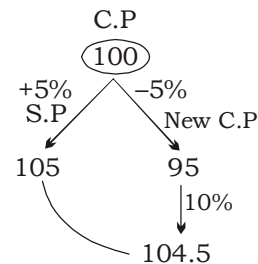
$$\frac{21x}{20} - \frac{209x}{200} = 2$$

$$\frac{210x - 209x}{200} = 2$$

$$= \frac{x}{200} = 2$$

$$x = ₹ 400$$

Alternate:-



$$0.5 \text{ Unit} = 2$$

$$1 \text{ unit} = 4$$

$$\text{C.P.} = 100 \text{ unit} = 100 \times 4 = 400$$

79. Applied to a bill for ₹ 1, 00,000 the difference between a discount of 40% and two successive discounts of 36% and 4% is?

- (a) ₹ 4000 (b) ₹ 2500
(c) ₹ 1440 (d) Nil

Sol. (c) 1st Discount = 40%

Net effect of two successive

$$\text{discount} = 36 + 4 - \frac{36 \times 4}{100}$$

$$= 40 - 1.44 = 38.56\%$$

$$\begin{aligned} \text{Percentage difference} &= 40 - 38.56 \\ &= 1.44\% \end{aligned}$$

Difference between discount

$$= 1.44\% \text{ of } 1,00,000$$

$$= \frac{144}{100} \times \frac{1}{100} \times 1,00,000$$

$$= ₹ 1440$$

80. A shopkeeper purchased a chair marked at ₹ 800, at two successive discounts of 10% and 15% respectively. He spent ₹ 28 on transportation and sold the chair for ₹ 800. His gain % is

- (a) 14% (b) 25%
(c) 30% (d) 40%

Sol. (b) M.P of chair = ₹ 800

After discount price of chair

$$= 800 \times \frac{90}{100} \times \frac{85}{100} = ₹ 612$$

After transportation

$$= 612 + 28 = ₹ 640$$

S.P of chair = ₹ 800

$$\text{Profit} = 800 - 640 = ₹ 160$$

$$\text{Profit \%} = \frac{160}{640} \times 100 = 25\%$$

81. The marked price of an electric iron is ₹ 690. The shopkeeper allows a discount of 10% and gains 8%. If no discount is allowed, his gain percent would be

- (a) 28% (b) 25%
(c) 24% (d) 20%

Sol. (d) M.P of an electric iron = ₹ 690

$$\begin{aligned} \text{After Discount, S.P.} &= 90\% \text{ of } 690 \\ &= ₹ 621 \end{aligned}$$

At Gain = 8%

$$\text{C.P. of an electric Iron} = \frac{621 \times 100}{100 + 8}$$

$$= \frac{621 \times 100}{108} = ₹ 575$$

No discount, gain of Iron

$$= 690 - 575 = ₹ 115$$

$$\text{gain \%} = \frac{115}{575} \times 100 = 20\%$$

Alternate:

$$\begin{array}{ccccc} \text{CP} & \xrightarrow{\text{Gain } 8\%} & \text{SP} & \xrightarrow{-10\%} & \text{MP} \\ 100 & & 108 & & 120 \end{array}$$

$$\text{Gain \%} = \frac{20}{100} \times 100\% = 20\%$$

82. A sells a scooter priced ₹ 36,000. He gives a discount of 8% on the first ₹ 20,000 and 5% on the next ₹ 10,000. How much discount can he afford on the remaining ₹ 6,000 if he is to get as much as when 7% discount is allowed on the total?

- (a) 8% (b) 7%
(c) 6% (d) 5%

Sol. (b) M.P of scooter = ₹ 36,000

According to question,

$$= 20000 \times \frac{8}{100} + 10,000 \times \frac{5}{100} +$$

$$6,000 \times \frac{x}{100}$$

$$= 36,000 \times \frac{7}{100}$$

$$\Rightarrow 1600 + 500 + 60x = 2520$$

$$\Rightarrow 60x = 420$$

$$x = \frac{420}{60} = 7\%$$

83. A shopkeeper gives 12% additional discount along with a discount of 20% on the marked price of a radio. If the selling price of the radio is ₹ 704, the marked price is

- (a) ₹ 1,000 (b) ₹ 1,044, 80
(c) ₹ 929, 28 (d) ₹ 844, 80

Sol. (a) S.P of radio = 704

$$\text{M.P of radio} = 704 \times \frac{100}{88} \times \frac{100}{80}$$

$$= ₹ 1,000$$

84. A dealer buys a car listed at ₹ 200000 at successive discounts of 5% and 10%. If he sells the car for ₹ 179550 then his profit is

- (a) 4% (b) 5%
(c) 9% (d) 10%

Sol. (b) L.P of a car = ₹ 200000

After successive discount

$$= 200000 \times \frac{95}{100} \times \frac{90}{100}$$

$$= ₹ 171000$$

$$\text{Profit} = 179550 - 171000$$

$$= ₹ 8550$$

$$\text{Profit \%} = \frac{8550}{171000} \times 100 = 5\%$$



85. A article listed at ₹ 800 is sold at successive discounts of 25% and 15%. The buyer desires to sell it off at a profit of 20% after allowing a 10% discount. What would be his list price?

(a) ₹ 620 (b) ₹ 600
(c) ₹ 640 (d) ₹ 680

Sol. (d) L.P of article = ₹ 800

After successive discount,

$$C.P = 800 \times \frac{75}{100} \times \frac{85}{100} = ₹ 510$$

$$M.P \times \frac{90}{100} \times \frac{100}{120} = C.P$$

$$M.P = 510 \times \frac{120}{100} \times \frac{100}{90} = 680$$

86. A difference between a discounts of 40% on ₹500 and two successive discounts of 36% and 4% on the same amount is

(a) ₹ 7.20 (b) ₹ 2.00
(c) ₹ 1.93 (d) ₹ 0

Sol. (a) Single discount = 40%

Two successive discount 36% and 4%

$$= 36 + 4 - \frac{36 \times 4}{100} = 38.56\%$$

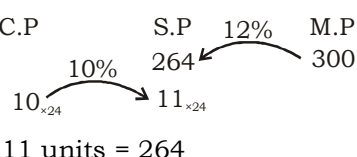
$$\text{Difference amount} = 40 - 38.56 = 1.44\% \text{ on } 500$$

$$= \frac{1.44}{100} \times 500 = ₹ 7.20$$

87. The marked price of a bucket is ₹ 300. The shopkeeper allows a discount of 12% and still gains 10% If no discount is allowed, his gain % would have been.

(a) 30% (b) 27%
(c) 25% (d) 20%

Sol. (c) C.P



$$\therefore 1 \text{ unit} = \frac{264}{11}$$

$$\therefore 10 \text{ units} = \frac{264}{11} \times 10 = ₹ 240$$

$$\text{gain\%} = \frac{300 - 240}{240} \times 100$$

$$= \frac{1}{4} \times 100 = 25\%$$

Alternate:

MP of a bucket = ₹ 300

$$S.P \text{ of a bucket} = 300 \times \frac{88}{100} = ₹ 264$$

$$C.P \text{ of a bucket} = 264 \times \frac{100}{110} = ₹ 240$$

$$\text{No discount allowed, gain} = 300 - 240 = ₹ 60$$

$$\text{gain \%} = \frac{60}{240} \times 100 = 25\%$$

88. A bicycle marked at ₹2000 is sold with two successive discount of 20% and 10%. An additional discount of 5% is offered for cash payment. The selling price of the bicycle at cash payment is?

(a) ₹ 1368 (b) ₹ 1468
(c) ₹ 1568 (d) ₹ 1668

Sol. (a) M.P of bicycle = ₹ 2000

After two successive discounts of 20% and 10%

$$= 2000 \times \frac{80}{100} \times \frac{90}{100} = ₹ 1440$$

Additional discount 5% for cash

$$\text{payment} = 1440 \times \frac{95}{100} = ₹ 1368$$

89. The difference between a discount 40% on ₹ 500 and two successive discounts of 30% and 10% on the same amount is

(a) ₹ 15 (b) 0
(c) ₹ 20 (d) ₹ 10

Sol. (a) 1st Discount = 40%

Two successive discounts

$$= 30 + 10 - \frac{30 \times 10}{100} = 40 - 3 = 37$$

$$\text{Difference} = 40 - 37 = 3\%$$

$$\text{Difference amount} = 3\% \text{ of } 500 = ₹ 15$$

90. An article is sold at discount of 20% an additional discount of 30% is allowed on cash payment. If seema purchased the article by paying ₹ 2240 in cash, the marked price of the article was

(a) ₹ 4480 (b) ₹ 4400
(c) ₹ 4368 (d) ₹ 4000

Sol. (d) M.P of the article = x

According to question,

$$80\% \text{ of } 70\% \text{ of } x = 2240$$

$$\frac{80}{100} \times \frac{70}{100} \times x = 2240$$

$$x = ₹ 4000$$

91. While selling a bike, a shopkeeper gives a discount of 10% on the marked price. If he gives a discount of 12% he earns 35 less as profit. The marked price of the bike is

(a) ₹ 1650 (b) ₹ 1625
(c) ₹ 1725 (d) ₹ 1750

Sol. (d) Let M.P of bike = ₹ x

After discount of 10%,

$$S.P = \frac{90}{100} x$$

After Discount of 12% S.P

$$= \frac{88}{100} x$$

According to question,

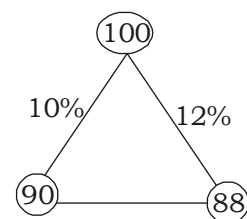
$$\frac{90}{100} x - \frac{88}{100} x = 35$$

$$\frac{2x}{100} = 35$$

$$x = \frac{35 \times 100}{2} = ₹ 1750$$

Alternate :

Let M.P. 100 units



$$2 \text{ units} \rightarrow 35$$

$$100 \text{ units} = 35 \times 50 = 1750$$



92. In a shop shirts are usually sold at 40% above the cost price. During a sale, the shopkeeper offers a discount of 10% off the usual selling price. If he manages to sell 72 shirts for 13608, then his cost price per shirt (in ₹) is?

- (a) 210 (b) 150
(c) 125 (d) 149

Sol. (b) Let the C.P of 1 shirt = ₹ 100

$$\begin{aligned}\text{M.P of 1 shirt} &= 140\% \text{ of } 100 \\ &= ₹ 140\end{aligned}$$

$$\text{S.P of 1 shirt} = 90\% \text{ of } 140$$

$$= \frac{90}{100} \times 140 = ₹ 126$$

$$\text{Actual S.P of 1 shirt} = \frac{13608}{72}$$

$$= ₹ 189$$

$$126 \rightarrow 189$$

$$100 \rightarrow \frac{189 \times 100}{126} = ₹ 150$$

93. The marked price of a chair is ₹ 800. A retailer bought it after two successive discounts of 10% and 15%. He spent ₹13 on transportation and sold it for ₹ 875. His profit was

- (a) 25% (b) 28%
(c) 37% (d) 40%

Sol. (d) Cost price for the retailer

$$= 800 \times \frac{90}{100} \times \frac{85}{100} + 13$$

$$= 612 + 13 = ₹ 625$$

$$\text{S.P} = 875$$

$$\text{Profit}\% = \frac{875 - 625}{625} \times 100$$

$$= \frac{250}{625} \times 100 = 40\%$$

94. Nishant bought 10 cycles for ₹ 500 each. He spent ₹ 2,000 on them and sold five of them for ₹ 750 each and the remaining for ₹ 550 each. Then the total gain or loss% is

(a) Gain of $8\frac{1}{3}\%$

(b) Loss of $8\frac{1}{3}\%$

(c) Gain of $7\frac{2}{3}\%$

(d) Loss of $7\frac{1}{7}\%$

Sol. (d) Nishant's CP of 10 Cycles is

$$500 \times 10 = 5000$$

$$\text{Additional Cost} = 2000$$

$$\text{Total Cost} = 7000$$

$$\text{SP of 10 Cycles} = 5 \times 750 = 3750$$

$$5 \times 550 = 2750$$

$$\text{Total SP} = 6500$$

$$\text{Loss}\% = \frac{7000 - 6500}{7000} \times 100$$

$$= 7\frac{1}{7}\%$$

95. Joni Mark up the price of an article by 50% and then allows a discount of 20% and sells it to Monu who sells it for ₹ 20 more than what he purchased for, this S.P is 30% more than the original C.P of the article. Then Monu's profit% is

- (a) 7.5% (b) 6.66%
(c) 8.33% (d) 9%

Sol. (c) Let original CP = 100 units

$$\begin{aligned}\text{C.P of Monu} &= 100 \times \frac{150}{100} \times \frac{80}{100} \\ &= 120 \text{ units}\end{aligned}$$

$$\begin{aligned}\text{S.P of Monu} &= \frac{130}{100} \times 100 \\ &= 130 \text{ units}\end{aligned}$$

$$\begin{aligned}\text{Profit of Monu} &= 130 - 120 \\ &= 10 \text{ units}\end{aligned}$$

$$\text{Profit}\% = \frac{10}{120} \times 100 = 8.33\%$$

Note:- There is no use of 20 given in the question.

96. An article is listed at ₹ 900 and two successive discounts of 8% and 8% are given on it. How much would the seller gain or lose, if he gives a single discount of 16% instead of two discounts?

- (a) ₹ 4.76 gain (b) ₹ 5.76 loss
(c) ₹ 5.76 gain (d) ₹ 4.76 loss

Sol. (b) Successive Discount of (8% and 8%)

$$8 + 8 - \frac{8 \times 8}{100} = 15.36$$

$$\begin{aligned}\text{Diff. of Discount} &= 16 - 15.36 \\ &= 0.64\end{aligned}$$

Certainly Seller would Loss in this case

$$\% \text{ Loss} = 900 \times 0.64\% = 5.76$$

Alternate:-

Equivalent discount for two successive discounts of 8% and 8%

$$= \left(8 + 8 - \frac{8 \times 8}{100} \right) \%$$

$$= (16 - 0.64)\% = 15.36\%$$

$$\therefore \text{S.P} = (100 - 15.36)\% \text{ of } 900$$

$$= ₹ \left(\frac{84.64 \times 900}{100} \right) = ₹ 761.76$$

For a single discount of 16%

$$\text{S.P} = 84\% \text{ of } 900$$

$$= ₹ \left(\frac{84 \times 900}{100} \right)$$

$$= ₹ 756$$

Certainly seller would loose in this case.

$$\therefore \text{Loss} = (761.76 - 756) = ₹ 5.76$$

97. A purchased a dining table marked at ₹ 3000 at a successive discounts of 10% and 15% respectively. He gave ₹ 105 as transportation charge and sold it at ₹ 3200. what is his gain % ?

(a) $22\frac{1}{3}\%$ (b) 25%

(c) $33\frac{1}{3}\%$ (d) $37\frac{17}{24}\%$

Sol. (c) C.P for A

$$= 3000 \times \frac{90}{100} \times \frac{85}{100}$$

$$= ₹ 2295$$

$$\text{Actual C.P} = 2295 + 105$$

$$= ₹ 2400$$

$$\therefore \text{Gain percent} = \frac{800}{2400} \times 100$$

$$= \frac{100}{3} = 33\frac{1}{3}\%$$

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Sol. (c) Let 5 kg of mixture is Prepared.

∴ C.P of 5 kg of mixture

$$= ₹ (2 \times 35 + 3 \times 40)$$

$$= ₹ (70 + 120) = ₹ 190$$

Total S.P of this mixture

$$= ₹ (46 + 4 \times 55)$$

$$= ₹ (46 + 220) = ₹ 266$$

∴ Profit percent

$$= \left(\frac{266 - 190}{190} \right) \times 100$$

$$= \frac{7600}{190} = 40\%$$

105. Successive discounts of 10% and 15% are equivalent to a single discount of.

(a) $22\frac{1}{2}\%$ (b) 23.5%

(c) 33.33% (d) 16.66%

Sol. (b) A.T.Q

effect of two successive discount

$$= 10 + 15 - \frac{10 \times 15}{100}$$

$$= 25 - 1.5 = 23.5\%$$

Alternative:-

10% 15%

$$\frac{1}{10} \quad \frac{15}{100} = \frac{3}{20}$$

$$\times \frac{10 \rightarrow 9}{200 \rightarrow 17} \quad \frac{153}{153}$$

$$\text{Discount\%} = \frac{47}{200} \times 100$$

$$= \frac{47}{2} = 23.5\%$$

106. Successive discounts of 10%, 20% and 40% is equivalent to a single discount of

(a) 56.8% (b) 54%

(c) 45% (d) $44\frac{4}{9}\%$

Sol. (a) A.T.Q

10% 20% 40%

$$\frac{1}{10} \quad \frac{1}{5} \quad \frac{2}{5}$$

$$\frac{10}{5} \quad \frac{9}{4} \quad \frac{3}{3}$$

$$\frac{250}{108}$$

$$\text{Discount\%} = \frac{142}{250} \times 100 = 56.8\%$$

107. Two successive discount of 30% and 35% is equivalent to a single discount of

(a) 44% (b) 54.5%

(c) $55\frac{5}{9}\%$ (d) 46%

Sol. (b) 30% 35%

$$\frac{3}{10} \quad \frac{7}{20}$$

$$\frac{10}{20} \quad \frac{7}{13}$$

$$\text{\%} = \frac{109}{200} \times 100 = 54.5\%$$

108. The single discount equal to three consecutive discount of 10%, 12% and 20%?

(a) 40% (b) 33.33%

(c) 36.64% (d) 32%

Sol. (c) A.T.Q Successive Discount of (10%, 12%, 20%)

$$= 10 + 12 - \frac{10 \times 12}{100}$$

$$= 22 - 1.2 = 20.8$$

Next

$$\Rightarrow 20.8 + 20 - \frac{20.8 \times 20}{100}$$

$$= 40.8 - 4.16 = 36.64\%$$

109. The single discount equivalent to the three successive discount of 15%, 25% and 35% is

(a) 58.5% (b) 75%

(c) 82% (d) 55%

Sol. (a) A.T.Q.

15% 25% 35%

$$\frac{15}{100} \quad \frac{1}{4} \quad \frac{35}{100}$$

$$\frac{3}{20} \quad \frac{1}{4} \quad \frac{7}{20}$$

$$\frac{20}{1600} \quad \frac{17}{663}$$

$$\text{\%} = \frac{937}{1600} \times 100 = 58.5\%$$

110. The single discount equivalent to the three successive discount of

$11\frac{1}{9}\%$, $16\frac{2}{3}\%$ and $33\frac{1}{3}\%$ is

(a) $66\frac{2}{3}\%$ (b) 50.61%

(c) 53% (d) $42\frac{6}{7}\%$

Sol. (b) A.T.Q.

$11\frac{1}{9}\%$ $16\frac{2}{3}\%$ $33\frac{1}{3}\%$

$$\frac{1}{9} \quad \frac{1}{6} \quad \frac{1}{3}$$

$$\frac{9}{81} \quad \frac{8}{40}$$

$$\text{\%} = \frac{41}{81} \times 100 = 50.61\%$$

111. The single discount equivalent to the discount series of $14\frac{2}{7}\%$,

$7\frac{1}{7}\%$ and $6\frac{1}{4}\%$ is

(a) 27% (b) 25%

(c) 24% (d) 25.3%

Sol. (d) A.T.Q.

$14\frac{2}{7}\%$ $7\frac{1}{7}\%$ $6\frac{1}{4}\%$

$$\frac{1}{7} \quad \frac{1}{14} \quad \frac{1}{16}$$

$$\frac{7}{16} \quad \frac{6}{15}$$

$$\text{\%} = \frac{199}{784} \times 100 = \frac{199}{196} \times 25$$

$$= \frac{4975}{196} = 25.3\%$$



112. A single discount equivalent to the successive discounts of

$14\frac{2}{7}\%$ and $11\frac{1}{9}\%$ is

(a) 23.8% (b) $22\frac{2}{9}\%$

(c) $25\frac{1}{9}\%$ (d) 40%

Sol. (a) A.T.Q.

$14\frac{2}{7}\%$ $11\frac{1}{9}\%$

$\frac{1}{7}$ $\frac{1}{9}$

$\frac{7}{9}$ $\frac{6}{8}$

$\frac{15}{63}$ $\frac{15}{63}$
 $\% = \frac{15}{63} \times 100 = 23.8\%$

113. A single discount equivalent to the successive discount of

$16\frac{2}{3}\%$ and 25% is

(a) 40% (b) 33.33%
 (c) 37.5% (d) 45%

Sol. (c) A.T.Q.

$16\frac{2}{3}\%$ 25%

$\frac{1}{6}$ $\frac{1}{4}$

$\frac{6}{4}$ $\frac{5}{3}$

$\frac{9}{24}$ $\frac{9}{24}$
 $\% = \frac{9}{24} \times 100 = 37.5\%$

114. The discount series 10%, $11\frac{1}{9}\%$ and 20% is equivalent to a single discount of

(a) 36% (b) 33%

(c) $41\frac{1}{9}\%$ (d) $44\frac{4}{9}\%$

Sol. (a) A.T.Q.

10% $11\frac{1}{9}\%$ 20%

$\frac{1}{10}$ $\frac{1}{9}$ $\frac{1}{5}$

$\frac{10}{9}$ $\frac{9}{8}$

$\frac{5}{50}$ $\frac{4}{32}$

$\frac{18}{50}$
 $\% = \frac{18}{50} \times 100 = 36\%$

115. A single discount equivalent to the successive discount of 10%,

$12\frac{1}{2}\%$ and 25% is

(a) 41% (b) $44\frac{4}{9}\%$

(c) 40.93% (d) 45%

Sol. (c) A.T.Q.

10% $12\frac{1}{2}\%$ 25%

$\frac{1}{10}$ $\frac{1}{8}$ $\frac{1}{4}$

$\frac{10}{8}$ $\frac{9}{7}$

$\frac{4}{320}$ $\frac{3}{189}$

$\frac{131}{320}$
 $\% = \frac{131}{320} \times 100 = 40.93\%$

116. In selling an article the single discount equivalent to two successive discount of $16\frac{2}{3}\%$ and 20% is

(a) $36\frac{2}{3}\%$ (b) 25%

(c) $33\frac{1}{3}\%$ (d) $66\frac{2}{3}\%$

Sol. (c) A.T.Q.

$16\frac{2}{3}\%$ 20%

$\frac{1}{6}$ $\frac{1}{5}$

$\frac{6}{5}$ $\frac{5}{4}$

$\frac{30}{30}$ $\frac{20}{20}$

$\frac{10}{30}$
 $\% = \frac{10}{30} \times 100 = 33\frac{1}{3}\%$

117. The marked price is 20% higher than cost price. A discount of 20% is given on the marked price. By this type of sale there is

(a) 4% loss
 (b) 4% gain
 (c) 25% gain
 (d) 20% loss

Sol. (a) A.T.Q.

+20% -20%

$+\frac{1}{5}$ $-\frac{1}{5}$

$\frac{5}{25}$ $\frac{6}{24}$

$\frac{1}{25}$ $\frac{1}{24}$

$\% = \frac{1}{25} \times 100 = 4\% \text{ loss}$

118. Two successive discount of 70% and 30% are equivalent to a single discount of

(a) 72% (b) 78%
 (c) 77% (d) 79%

Sol. (d) A.T.Q.

70% 30%

$\frac{7}{10}$ $\frac{3}{10}$

$\frac{10}{100}$ $\frac{3}{7}$

$\frac{1}{100}$ $\frac{1}{21}$

$\frac{79}{100}$
 $\% = \frac{79}{100} \times 100 = 79\%$

119. Which of the following successive discount is better to a customer?

1. 20%, 15%, 10% or
 2. 25%, 12%, 8% ?

(a) 1 is better
 (b) 2 is better
 (c) both are same
 (d) None

Sol. (b) Option (1)

20% 15% 10%

$\frac{1}{5}$ $\frac{3}{20}$ $\frac{1}{10}$

$\frac{5}{20}$ $\frac{4}{17}$

$\frac{10}{250}$ $\frac{9}{153}$

$\frac{97}{250}$
 $\% = \frac{97}{250} \times 100 = 38.8\%$



(2) Option 25% 12% 8%

$$\frac{1}{4} \quad \frac{3}{25} \quad \frac{2}{25}$$

$$\frac{4}{25} \quad \frac{3}{23}$$

$$\frac{25}{2500} \quad \frac{23}{1518}$$

$$982$$

$$\% = \frac{982}{2500} \times 100 = 39.28\%$$

∴ 2nd case is better for the customer.

120. Which of the following successive discounts is better to a customer?

(1) $11\frac{1}{9}\%$, $16\frac{2}{3}\%$

(2) 20%, 10%

(a) 1 (b) 2
(c) both same (d) None

Sol. (b) A.T.Q.

1. Option

$$11\frac{1}{9}\% \quad 16\frac{2}{3}\%$$

$$\frac{1}{9} \quad \frac{1}{6}$$

$$\frac{9}{6} \quad \frac{8}{5}$$

$$\frac{54}{54} \quad \frac{40}{40}$$

$$14$$

$$\% = \frac{14}{54} \times 100 = 25.9\%$$

(2) Option A.T.Q.

$$20\% \quad 10\%$$

$$\frac{1}{5} \quad \frac{1}{10}$$

$$\frac{5}{10} \quad \frac{4}{9}$$

$$\frac{50}{50} \quad \frac{36}{36}$$

$$14$$

$$\% = \frac{14}{50} \times 100 = 28\%$$

∴ 2nd case is better to the customer.

121. A company offers three types of successive discounts:

(i) 30%, and 10%

(ii) 35%, and 5%

(iii) 25%, and 15%

Which offer is the best for a customer?

(a) (i) (b) (ii)
(c) (iii) (d) All are equal

Sol. (b) A.T.Q.

Option (i)

$$30\% \quad 10\%$$

$$\frac{3}{10} \quad \frac{1}{10}$$

$$\frac{10}{10} \quad \frac{7}{9}$$

$$\frac{100}{100} \quad \frac{63}{63}$$

$$37$$

$$\% = \frac{37}{100} \times 100 = 37\%$$

Option (ii) 35% 5%

$$\frac{35}{100} = \frac{7}{20} \quad \frac{1}{20}$$

$$\frac{20}{20} \quad \frac{13}{19}$$

$$\frac{400}{400} \quad \frac{247}{247}$$

$$153$$

$$\% = \frac{153}{400} \times 100 = 38.25\%$$

Option (iii) 25% 15%

$$\frac{1}{4} \quad \frac{15}{100} = \frac{3}{20}$$

$$\frac{4}{20} \quad \frac{3}{17}$$

$$\frac{20}{80} \quad \frac{17}{51}$$

$$29$$

$$\% = \frac{29}{80} \times 100 = 36.25\%$$

(ii) offer is best for customer

122. A shopkeeper offer two types of successive discounts

(i) $6\frac{1}{4}\%$ and 15%

(ii) $6\frac{2}{3}\%$ and 20%

Which offer is the best for a customer?

(a) (ii) (b) (i)
(c) both (d) None

Sol. (a) A.T.Q.

(i) $6\frac{1}{4}\%$ 15%

$$\frac{1}{16} \quad \frac{3}{20}$$

$$\frac{16}{20} \quad \frac{15}{255}$$

$$65$$

$$\% = \frac{65}{320} \times 100 = 20.31\%$$

(ii) $6\frac{2}{3}\%$ 20%

$$\frac{1}{15} \quad \frac{1}{5}$$

$$\frac{15}{5} \quad \frac{14}{4}$$

$$19$$

$$\% = \frac{19}{75} \times 100 = 25.33\%$$

2nd is better for a customer.

123. A shopkeeper offers three types of successive discounts

(i) $14\frac{2}{7}\%$ and 20%

(ii) $9\frac{1}{11}\%$ and 25%

(iii) $33\frac{1}{3}\%$ and $66\frac{2}{3}\%$

Which offer the best for a customer?

(a) (iii) (b) (i)
(c) (ii) (d) All are equal

Sol. (a) A.T.Q.

(i) $14\frac{2}{7}\%$ 20%

$$\frac{1}{7} \quad \frac{1}{5}$$

$$\frac{7}{35} \quad \frac{6}{24}$$

$$11$$

$$\% = \frac{11}{35} \times 100$$

$$= 31.42\%$$



$$(ii) 9\frac{1}{11}\% \quad 25\%$$

$$\frac{1}{11} \quad \frac{1}{4}$$

$$\frac{11}{44} \quad \frac{10}{30}$$

$$\% = \frac{14}{44} \times 100 = 31.81\%$$

$$(iii) 33\frac{1}{3}\% \quad 66\frac{2}{3}\%$$

$$\frac{1}{3} \quad \frac{2}{3}$$

$$\% = \frac{7}{9} \times 100 = 77.77\%$$

IIIrd is better for a customer.

124. A book seller offer two types of successive discounts

$$(i) 42\frac{6}{7}\% \text{ and } 50\%$$

$$(ii) 40\% \text{ and } 4\frac{1}{6}\%$$

Which offer is the best for book-seller?

- (a) (ii) (b) (i)
(c) both (d) None

Sol. (a) A.T.Q.

$$(i) 42\frac{6}{7}\% \quad 50\%$$

$$\frac{3}{7} \quad \frac{1}{2}$$

$$\frac{7}{14} \quad \frac{4}{4}$$

$$\% = \frac{10}{14} \times 100 = 71.42\%$$

$$(ii) 40\% \quad 4\frac{1}{6}\%$$

$$\frac{2}{5} \quad \frac{1}{24}$$

$$\frac{24}{120} \quad \frac{23}{69}$$

$$\% = \frac{51}{120} \times 100 = 42.5\%$$

IInd offer is the best for book-seller

125. A company offer two types of successive discounts

- (i) 20% and 30%
(ii) 25% and 5%

Which offer is the best for a company?

- (a) (i)
(b) (ii)
(c) both are equal
(d) None

Sol. (b) A.T.Q.

$$(i) 20\% \quad 30\%$$

$$\frac{1}{5} \quad \frac{3}{10}$$

$$\frac{10}{50} \quad \frac{7}{28}$$

$$\% = \frac{22}{50} \times 100 = 44\%$$

$$(ii) 25\% \quad 5\%$$

$$\frac{1}{4} \quad \frac{1}{20}$$

$$\frac{20}{80} \quad \frac{19}{57}$$

$$\% = \frac{23}{80} \times 100 = \frac{115}{4} = 28.75\%$$

IInd offer is the best for company

126. A table with marked price ₹ 5000 was sold to a customer for ₹ 4600. Find the rate of discount?

- (a) 7% (b) 8%
(c) 9% (d) $11\frac{1}{9}\%$

Sol. (b) % discount

$$= \frac{5000 - 4600}{5000} \times 100 = \frac{400}{5000} \times 100 = 8\%$$

127. A woman purchases a Saree for ₹ 7710 after availing a net discount of ₹ 1285. The percentage of discount, the Saree shop offers, is

$$(a) 14\frac{3}{7}\% \quad (b) 14\frac{2}{7}\%$$

$$(c) 14\frac{4}{7}\% \quad (d) 14\frac{1}{7}\%$$

Sol. (b) MP of the saree = 7710 + 1285 = 8995

$$\% \text{ discount} = \frac{1285}{8995} \times 100 = 14\frac{2}{7}\%$$

128. A shopkeeper sold an item at 10% loss after giving a discount equal to half the marked price. Then the cost price is

$$(a) \frac{7}{9} \text{th of the marked price}$$

$$(b) \frac{5}{9} \text{th of the marked price}$$

$$(c) \frac{4}{9} \text{th of the marked price}$$

$$(d) \frac{1}{9} \text{th of the marked price}$$

Sol. (b) Let the CP = ₹ 100

$$SP = ₹ 90$$

$$MP = 90 \times 2 = ₹ 180$$

$$= \frac{CP}{MP} = \frac{100}{180} = \frac{5}{9}$$

$$CP = \frac{5}{9} MP$$

129. The total discount on ₹ 1800 due after a certain time at 5% is 60. Find the time after which it is due

- (a) 7 months (b) 10 months
(c) 8 months (d) 9 months



Sol. (c) Required time = $\frac{60 \times 100}{1800 \times 5}$

$$= \frac{2}{3} \text{ year} = \frac{2}{3} \times 12 = 8 \text{ months}$$

130. A shop was sold for ₹ P by giving a discount for q% then the list price was

(a) $1 - \frac{q}{100}$ (b) $\frac{100q}{100 - p}$

(c) $\frac{100p}{1 - q}$ (d) $\frac{100p}{100 - q}$

- Sol.** (d) Let the marked price of shop be ₹ R

A.T.Q

$$R \times (100 - q)\% = P$$

$$R \times \frac{100 - q}{100} = P$$

$$R = ₹ \frac{100p}{100 - q}$$

131. The list price of a dress is ₹ 100. A shopkeeper sells three such dresses for ₹ 274.50 after allowing discount at a certain rate. Find the rate of discount.

(a) 8.5% (b) 8.34%
(c) 8.33% (d) 8.16%

- Sol.** (a) Total marked price of three dress = ₹ 300

$$\text{Their sp} = ₹ 274.50$$

$$\text{Discount} = ₹ (300 - 274.50) = ₹ 25.70$$

$$D\% = \frac{D}{MP} \times 100$$

$$x = \frac{25.50 \times 100}{300}$$

$$= 8.5\%$$

132. The price of sugar is reduced by 20% and then price is again reduced by 10%. The total reduction of the price is

(a) 28% (b) 23%
(c) 30% (d) 25%

- Sol.** (a)

$$20\% = \frac{-1}{5}, 10\% = \frac{-1}{10}$$

Initial	:	Final
5	:	4
$\frac{10}{50}$	:	$\frac{9}{36}$
14		

$$\% \text{ decrease} = \frac{14}{50} \times 100 = 28\%$$

133. The Market Printed Price of book is 440 and a customer pays 396 for it. The discount rate is

(a) 12% (b) 20%
(c) 10% (d) $10\frac{1}{2}\%$

- Sol.** (c) Discount = 440 - 396 = ₹ 44

$$\begin{aligned} D\% &= \frac{D}{MP} \times 100 \\ &= \frac{44}{440} \times 100 \\ &= 10\% \end{aligned}$$

134. Monu is to pay Sonu 600 in 4 years time Monu wants to pay up Sonu at present. What discount Sonu allow Monu. If the rate is 5% per annum.

(a) ₹ 110 (b) ₹ 500
(c) ₹ 100 (d) ₹ 96

- Sol.** (c) A.T.Q

$$= \frac{\text{Amount} \times 100}{100 + (R \times T)}$$

$$= \frac{600 \times 100}{100 + (5 \times 4)}$$

$$= \frac{600 \times 100}{120} = 500$$

$$\begin{aligned} \therefore \text{Discount} &= ₹ 600 - 500 \\ &= ₹ 100 \end{aligned}$$

Alternate:

$$R = 5\%$$

$$R = 5 \times 4 = 20\% \text{ (for 4 years)}$$

After 4 years	Present
120	100
↓ ×5	↓ ×5
600	500

$$\therefore \text{Discount} = 600 - 500 = 100$$

135. The marked price of a book is ₹ 60 and at a certain discount that book was sold for ₹ 45. Then rate of discount allowed is

(a) 25% (b) 35%
(c) 20% (d) 30%

- Sol.** (a) If the rate discount be x% then

$$\frac{60 \times x}{100} = 60 - 45 = 15$$

$$x = \frac{15 \times 100}{60} = 25\%$$

Alternate:

$$\text{Discount} = 60 - 45 = 15$$

$$D\% = \frac{15}{60} \times 100 = 25\%$$

136. The interest on a certain sum of money is ₹ 22 and the true discount on the same sum for the same time and the same rate is ₹ 20, find the sum

(a) ₹ 212 (b) ₹ 200
(c) ₹ 210 (d) ₹ 220

- Sol.** (d) Sum = $\frac{SI \times \text{True discount}}{SI - \text{True discount}}$

$$= \frac{22 \times 20}{22 - 20} = ₹ 220$$

137. The Banker's discount on a bill due 6 months hence at 16% per annum is ₹ 216. The true discount is

(a) ₹ 220 (b) ₹ 200
(c) ₹ 400 (d) ₹ 205

- Sol.** (B) True discount

$$= \frac{\text{Banker's discount}}{100 + \text{Rate} \times \text{Time}} \times 100$$

$$= \frac{216 \times 100}{100 + 16 \times \frac{6}{12}} = ₹ 200$$



138. The selling price of a Radio is 740 and the discount allowed is 7.5%. The marked price of the radio is

(a) ₹ 780 (b) ₹ 740
(c) ₹ 800 (d) ₹ 720

Sol. (c) A.T.Q

Marked price

$$= \frac{100}{(100 - 7.5)} \times 740$$

$$= \frac{740 \times 100}{92.5} = ₹ 800$$

139. A cooler is listed at ₹150 and a discount of 20% is given. Then the selling price is

(a) ₹ 100 (b) ₹ 120
(c) ₹ 90 (d) ₹ 80

Sol. (b) A.T.Q

$$\begin{aligned} \text{SP of the cooler} &= \frac{150 \times 80}{100} \\ &= ₹ 120 \end{aligned}$$

140. A book was sold for 3600 at 25% discount its marked price is

(a) ₹ 4810 (b) ₹ 4700
(c) ₹ 4800 (d) ₹ 4600

Sol. (c) Let c.p of article = ₹ x

A.T.Q

$$\frac{x \times 75}{100} = 3600$$

$$x = \frac{3600 \times 100}{75}$$

$$x = ₹ 4800$$

141. A chair with marked price ₹ 1200 was sold to a customer for ₹ 1100. Find the rate of discount allowed on the table.

(b) 10% (b) $8\frac{1}{3}\%$

(c) 9% (d) $9\frac{1}{3}\%$

Sol. (b)

$$\text{Discount\%} = \frac{D}{MP} \times 100$$

$$D\% = \frac{1200 - 1100}{1200} \times 100 = 8\frac{1}{3}\%$$

142. A dealer allows his customers a discount of 25% and still gains 25%. If an article costs ₹ 1440 to the dealer then its marked price is

(a) 2560 (b) 1500
(c) 1850 (d) 2400

Sol. (d) Let the mp of article be ₹ x
A.T.Q

$$\frac{x \times 75}{100} = \frac{1440 \times 125}{100}$$

$$x = \frac{1440 \times 125}{75} = ₹ 2400$$

143. After allowing a discount of 20% a fan is available for ₹ 1200. Its marked price was

(a) ₹ 1400 (b) ₹ 1550
(c) ₹ 1500 (d) ₹ 1800

Sol. (C) Let the marked price of fan be ₹ x

A.T.Q 80% of x = 1200

$$\frac{x \times 80}{100} = 1200$$

$$\Rightarrow x = \frac{1200 \times 100}{80} = ₹ 1500$$

Alternate:

$$MP = \frac{1200 \times 10}{80} = 1500$$

144. The listed price of a book is ₹ 270 and it is available at ₹ 237.60. The rate of discount is

(a) 20% (b) 12%
(c) 10% (d) 15%

Sol. (b) Discount = 270 - 237.60
= ₹ 32.4

$$D\% = \frac{D}{MP} \times 100$$

$$D\% = \frac{32.4 \times 100}{270} = 12\%$$

145. A shopkeeper, in order to clear his old stock of fans offers 12% discount on the fans. If the marked price of a fan is ₹ 6500 the selling price of the fan is

(a) ₹ 6000 (b) ₹ 5720
(c) ₹ 5400 (d) ₹ 5700

Sol. (b) Rate of discount = 12%

∴ S.P of a fan

$$= 6500 \times (100 - 12)\%$$

$$= \frac{6500 \times 88}{100} = ₹ 5720$$

146. Articles are marked at a price which gives a profit of 25%. After allowing a certain discount the profit reduces to

$12\frac{1}{2}\%$. The discount percent is

(a) 12% (b) 10%

(c) 11.1% (d) $12\frac{1}{2}\%$

Sol. (b) Let the cp of each article be ₹ 100

∴ marked price = ₹ 125

on giving discount

sp = ₹ 112.5

$$\begin{aligned} \therefore \text{discount} &= 125 - 112.5 \\ &= ₹ 12.5 \end{aligned}$$

$$\text{Discount \%} = \frac{12.5}{125} \times 100 = 10\%$$

147. A book is listed at ₹ 180 and a discount of 20% is given the selling price is

(a) ₹ 144 (b) ₹ 134
(c) ₹ 142 (d) ₹ 1440

Sol. (a) s.p of the fan = $\frac{180 \times 80}{100}$
= ₹ 144

148. A washing machine is sold at a discount of 30%. If a man buys it for ₹ 6580, its list price is

(a) ₹ 9200 (b) ₹ 8800
(c) ₹ 9400 (d) ₹ 10,000

Sol. (c) Marked price = $\frac{6580 \times 100}{70}$
= ₹ 9400

149. Rakesh bought a cooler with

$16\frac{2}{3}\%$ discount on the labelled

price. Had he bought it with 25% discount, he would have saved ₹ 600. At what price did he buy the cooler

(a) ₹ 6000 (b) ₹ 7000
(c) ₹ 6100 (d) ₹ 6200



Sol. (a) Difference of discounts

$$\left(25 - \frac{50}{3}\right)\% = \frac{25}{3}\%$$

Let the mp be x then

$$x \times \frac{25}{300} = 600$$

$$x = ₹ 7200$$

Required s.p.

$$= 7200 \times \left(100 - \frac{50}{3}\right)\%$$

$$= \frac{7200 \times 250}{300} = 6000$$

150. A shopkeeper sells his goods at 15% discount. The marked price of an article whose selling price is ₹ 629 is

- (a) ₹ 740 (b) ₹ 700
(c) ₹ 704 (d) ₹ 614

Sol. (a) Let the marked price be = ₹ x

$$\therefore \frac{x \times 85}{100} = 629$$

$$x = \frac{629 \times 100}{85} = ₹ 740$$

151. An article which is marked ₹ 650 is sold for ₹ 572. The discount gives is

- (a) 26% (b) 12%
(c) 21% (d) 13%

Sol. (b) Discount = 650 - 572 = ₹ 78
If the discount be x% then

$$\frac{650 \times x}{100} = 78$$

$$x = \frac{78 \times 100}{650} = 12\%$$

152. A discount of 16% on the marked price of a book enables a man to buy a pen that cost ₹ 800. How much did he pay for the book?

- (a) ₹ 3400 (b) ₹ 4200
(c) ₹ 4000 (d) ₹ 4800

Sol. (b) Let the amount paid be x
16% of x = 800

$$\therefore x = \frac{800}{16} \times 100 = ₹ 5000 = \text{M.P}$$

$$\text{SP} = 5000 - 800 = ₹ 4200$$

153. A discount of 24% on the marked price of an article is allowed and then the article is sold for ₹ 342. The marked price of the article is

- (a) ₹ 430 (b) ₹ 450
(c) ₹ 500 (d) ₹ 3490

Sol. (b) Let the MP of article be x then

$$x = \frac{342 \times 100}{76} = ₹ 450$$

154. A book seller allows 4% discount on his marked price. If the cost price of a book is 100 and he has to make a profit of 20% then his marked price must be

- (a) ₹ 130 (b) ₹ 120
(c) ₹ 125 (d) ₹ 395

Sol. (c) Let the MP of the book be x
A.T.Q

$$96\% \text{ of } x = 120\% \text{ of } 100$$

$$x \times \frac{96}{100} = \frac{100 \times 120}{100}$$

$$x = \frac{100 \times 120}{96} = ₹ 125$$

155. Seema bought a Saree with 20% discount on list price had she bought it with 25% discount she would have saved 500. At what price did she buy the Saree?

- (a) ₹ 80000 (b) ₹ 12000
(c) ₹ 10000 (d) ₹ 16000

Sol. (a) Difference in discount = 25% - 20% = 5%

$$\text{MP} = \frac{500 \times 100}{5} = 10000$$

Initial SP of Saree

$$= \frac{10000 \times 80}{10} = ₹ 80000$$

156. A whole sale trader bought 20 radio for 1200 rupees per radio and he spent Rs. 25 per radio on 10 radio and spent 150 rupees on transportation of all he sold all of them at 20% profit to the retailer. If the retailer wants to

make 25% profit then at what rate per radio must he sell them to customers?

- (a) Rs. 2000 (b) Rs. 1830
(c) Rs. 1750 (d) Rs. 1600

Sol. (b) Total cost of all radios

$$= 20 \times 1200 + 10 \times 25 + 150$$

$$= 24000 + 250 + 150 = 24400$$

So, final cost per radio

$$= \frac{24400}{20} = 1220$$

Selling price of the whole seller

$$= \frac{6}{5} \times 1220 = 1464$$

Selling price of the retailer to his

$$\text{customer} = \frac{5}{4} \times 1464$$

$$= 1830 \text{ rupees}$$

Hence required rate per radio

$$= \text{Rs. 1830}$$

Alternatively:-

To make one line approach.

The price per radio required

$$= \frac{1}{20} \times \frac{5}{4} \times \frac{6}{5} [24000 + 400]$$

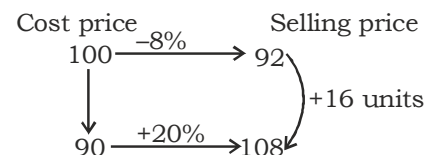
$$= \frac{1}{20} \times \frac{30}{20} \times 24400$$

$$= 1830 \text{ rupees.}$$

157. Pankaj sold a radio at 8% loss. Had he bought it at 10% less and sold at 20% profit, he would have gained 5120 rupees more than before. Find the initial cost price of the radio.

- (a) Rs. 36000 (b) Rs. 3200
(c) Rs. 45000 (d) Rs. 32000

Sol. (d) Let the initial cost price of the radio be 100 units



So,

$$16 \text{ units} = \text{Rs. 5120}$$

$$100 \text{ units} = \frac{100}{16} \times 5120$$

Hence, cost price of the radio

$$= \text{Rs. 32,000}$$



158. Nishant sold three T.V sets at Rs. 12000, Rs. 15000, and Rs. 11000 respectively on first t.v she made 20% profit on second 25% profit. But on the whole transaction she suffered a loss of 5%. Find the cost price of third t.v ?

- (a) 22000 (b) 18000
(c) 2000 (d) None of these

Sol. (b) Total selling price of all three T.V. sets

$$= 12000 + 15000 + 11000 = 38000$$

Total cost price of three T.V sets

$$= \frac{20}{19} \times 38000 = 40,000$$

Cost price of first two T.V

$$= \frac{5}{6} \times 12000 + \frac{4}{5} \times 15000$$

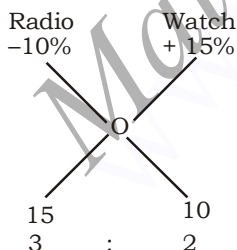
$$= 10000 + 12000 = 22000$$

So, the cost price of the third T.V.
= 40,000 - 22,000 = 18,000

159. Goutam bought a radio and a watch for 6000 rupees. She sold radio at 10% loss and watch at 15% profit. In this way there was no loss and no profit at all. Find the difference between the cost price of radio and watch.

- (a) Rs. 2000 (b) Rs. 1200
(c) Rs. 1800 (d) Rs. 1000

Sol. (b) This can be solved by mixture and allegation:-



Hence, the ratio of cost price of radio and watch = 3:2

Difference of cost price

$$= \frac{1}{5} \times 6000 = 1200$$

160. A man bought a horse and a camel. He sold horse at 20% profit and camel at 10% loss and in this way he made neither profit nor loss. Had he sold the horse at 5% loss and camel at 5% profit he would have earned 600 rupees. Find the cost price of horse and camel.

- (a) 12000, 24000
(b) 10000, 20000
(c) 12000, 18000
(d) 18000, 36000

Sol. (a) Let the cost price of horse be x and that of camel by y rupees. Condition (I): Since there is no profit no loss is means profit at one must be equal to loss at other.

$$\frac{1}{5}x = \frac{1}{10}y$$

$$\Rightarrow x = \frac{1}{2}y$$

Condition (II):-

$$-\frac{1}{20}x + \frac{1}{20}y = 600$$

$$-x + y = 20 \times 600$$

$$-\frac{1}{2}y + y = 12000 \quad \left[\because x = \frac{1}{2}y \right]$$

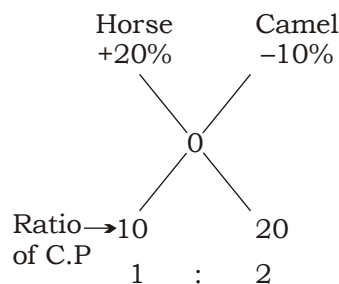
$$\frac{1}{2}y = 12000$$

$$\therefore \text{The cost of camel } y = 24000$$

$$\text{and the cost of horse } = \frac{1}{2}y$$

$$= 12000$$

Alternate:-



Let the C.P of Horse = 100 and Camel = 200

Now,

$$\text{Loss on Horse} = 5 \times \frac{100}{100}$$

$$= -5 \text{ (Loss)}$$

$$\begin{aligned} \text{Profit on Camel} &= 5 \times \frac{200}{100} \\ &= +10 \text{ (Profit)} \end{aligned}$$

$$\text{Overall } 10-5 = 5 \text{ Unit (Profit)}$$

$$5 \text{ Unit} = 600$$

$$1 \text{ unit} = 120$$

$$\begin{aligned} \text{C.P of Horse} &= 100 \times 120 \\ &= 12000 \end{aligned}$$

$$\begin{aligned} \text{C.P of Camel} &= 200 \times 120 \\ &= 24000 \end{aligned}$$

161. Joni bought 240 rims paper at the rate of 3200 rupees per rim. He spend 1080 rupees on the transportation and paid a sale tax at the rate of 80 paise per rim. He paid 200 rupees to porter and got made 2400 books of all the paper to earn a profit of 40% what should be the marked price of each book (approximately)?

- (a) 450 (b) 449
(c) 445 (d) None of these

Sol. (b) Total cost of the paper

$$= 240 \times 3200 + 1080 + \frac{80 \times 240}{100}$$

$$+ 200 = 769472$$

Total marked price of all books

$$= \frac{7}{5} \times 769472$$

Marked price of one book

$$= \frac{1}{2400} \times \frac{7}{5} \times 769472$$

$$= \text{Rs. } 448.84 = \text{Rs. } 449 \text{ (approx)}$$

162. A shopkeeper allows 20% discount on the marked price of a watch and sells it in 960 rupees. If he gives no discount his profit is 40%. If he wants to make 54% profit what should be the selling price of the watch.

- (a) 1540 (b) 1320
(c) 1288 (d) 1600

Sol. (b) Coming to one line approach the required selling price of the watch

$$= \frac{154}{100} \times \left[\frac{5}{7} \times \left(\frac{5}{4} \times 960 \right) \right]$$

$$= \text{Rs. } 1320$$

**Alternate:-**

$$\begin{aligned}\text{Marked Price} &= \frac{960}{80} \times 100 \\ &= 1200\end{aligned}$$

$$\text{C.P} = \frac{1200 \times 100}{140} = \frac{6000}{7}$$

Selling price of watch

$$= \frac{6000}{7} \times \frac{154}{100} = ₹ 1320$$

163. If a person sells an article at 10% profit instead of 5% loss he gets Rs. 75 more find the cost price of the article.

- (a) Rs. 1500 (b) Rs. 500
(c) Rs. 750 (d) Rs. 1000

Sol. (b) Let the cost price of the article be $100x$ units

They by question

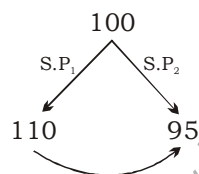
$$110x - 95x = \text{Rs. } 75$$

$$15x = \text{Rs. } 75$$

$$x = \text{Rs. } 5$$

$$100x = \text{Rs. } 500$$

Hence the C.P. of the article is Rs. 500

Alternate:-

$$15 \text{ Unit} = 75$$

$$1 \text{ Unit} = 5$$

$$\text{C.P of Article} = 100 \times 5 = 500$$

164. A man earned $\frac{1}{10}$ of the cost price

of book by selling it for Rs. 891. Find the cost price of the book.

- (a) 850 (b) 800
(c) 810 (d) 840

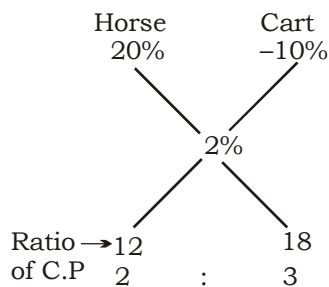
Sol. (c) Cost price of book

$$= \frac{10}{11} \times 891 = \text{Rs. } 810$$

165. A man bought a horse and a cart for Rs. 20,000. He sold horse at 20% profit and cart at 10% loss. In this way he got a profit of 2%. Find the cost price of horse.

- (a) 7000 (b) 10,000
(c) 8000 (d) 9000

Sol. (c) This question can be solved by mixture and alligation



Hence cost price of horse

$$= \frac{2}{5} \times 20,000 = 8,000$$

166. A man sold an article to B at 15% profit and B sold it to C at 10% loss. It C has paid Rs. 517.50 for the article. Find the cost at which A bought it?

- (a) 500 (b) 700
(c) 200 (d) 1000

Sol. (a) Let A bought the article for x rupees.

$$\text{Then, } x \times \frac{23}{20} \times \frac{9}{10} = 517.50$$

$$x = \frac{517.50 \times 20 \times 10}{23 \times 9} = \text{Rs. } 500$$

167. The profit made on an article selling at 900 is double than the loss incurred when the article is sold for Rs. 600. Find the cost price of the article

- (a) Rs. 240 (b) Rs. 200
(c) Rs. 700 (d) Rs. 100

Sol. (c) Let the loss be x rupees when it is sold at Rs. 600

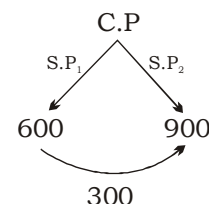
So,

$$\text{C.P.} = 600 + x = 900 - 2x$$

$$3x = 300$$

$$x = 100$$

$$\text{Cp} = 600 + 100 = \text{Rs. } 700$$

Alternate:-

$$300$$

$$3 \text{ Units} = 300$$

$$1 \text{ Unit} = 100$$

$$\text{C.P} = 600 + 100 = 700$$

168. A shopkeeper sold his chair at $2\frac{1}{2}\%$ loss. If he had sold it for Rs. 100 more, he would have earned $7\frac{1}{2}\%$ profit. To earn a profit of $12\frac{1}{2}\%$ what should be selling price of the chair ?

- (a) Rs. 1000 (b) Rs. 1225
(c) Rs. 1525 (d) Rs. 1125

Sol. (d) Given that

$$\left(2\frac{1}{2} + 7\frac{1}{2}\right)\% = \text{Rs. } 100$$

$$\begin{aligned}\text{Cost of the chair} &= 100\% \\ &= \text{Rs. } 1000\end{aligned}$$

$$\begin{aligned}\text{Required selling price} &= 112\frac{1}{2}\% \\ \text{of } 100 &= \text{Rs. } 1125\end{aligned}$$

169. Out of total 100 article half were sold at 20% profit and the remaining were sold at 40% profit. Had all articles were sold at 25% profit, there would have a profit of Rs. 100 less than before. Find cost price of each article.

- (a) Rs. 50 (b) Rs. 10
(c) Rs. 30 (d) Rs. 20

Sol. (d) Condition (i)

Total profit on the whole transaction

$$= \frac{1}{2} \times 20\% + \frac{1}{2} \times 40\% = 30\%$$

Condition (ii)

Total profit on the whole transaction = 25%

But by the question.

$$30\% - 25\% = \text{Rs. } 100$$

$$5\% = \text{Rs. } 100$$

$$\begin{aligned}\text{Total cost of all article } 100\% \\ &= \text{Rs. } 2000\end{aligned}$$

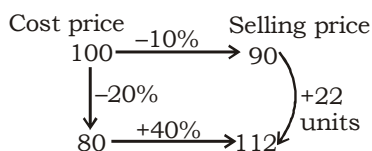
$$\begin{aligned}\text{Cost of one article} &= \frac{2000}{100} \\ &= \text{Rs. } 20\end{aligned}$$



170. A man sold an article at 10% loss. Had he bought it at 20% less and sold it Rs. 55 more, he would have earned 40% profit find the cost price of the article.

(a) Rs. 200 (b) Rs. 150
(c) Rs. 250 (d) Rs. 75

Sol. (c) Let the cost price of the article be 100 units.



By question,

$$22 \text{ units} = \text{Rs. } 55$$

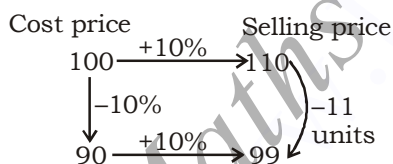
$$1 \text{ unit} = 2.5$$

Hence the cost price of the article = $100 \times 2.5 = \text{Rs. } 250$

171. A shopkeeper bought an electric iron and sold it at 10% profit. Had he bought it at 10% less and sold it for Rs. 16.50 loss, he would have earned 10% profit. Find the cost price of the electric iron.

(a) Rs. 100 (b) Rs. 150
(c) Rs. 80 (d) Rs. 30

Sol. (b) Let the cost price of electric iron = 100 units.



Now by question

$$11 \text{ units} = \text{Rs. } 16.50$$

$$100 \text{ units} = \frac{100}{11} \times 16.50$$

$$\text{Cost price} = \text{Rs. } 150$$

172. A shopkeeper allows a discount of 5% on the marked price of the items and he makes a profit of 10%. if the cost price of an item be Rs. 95 then find its marked price.

(a) Rs. 50 (b) Rs. 110
(c) Rs. 20 (d) Rs. 10

Sol. (b) Let the marked price be x rupees.

The,

$$x \times \frac{19}{20} = 95 \times \frac{11}{10}$$

$$x = \text{Rs. } 110$$

173. A bookseller sells his books at 10% profit. If he buys it at 4% less and sells it for 60 paise more

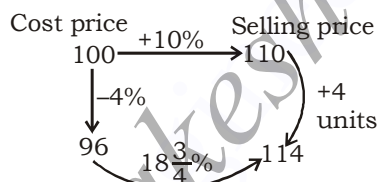
he will earn $18\frac{3}{4}\%$ profit. At

what rate the book seller bought the book?

(a) 12 Rupees (b) 18 Rupees
(c) 10 Rupees (d) 15 Rupees

Sol. (d) Let the price of book be 100 units

Cost price selling price



$$4 \text{ units} = 60 \text{ paise}$$

$$100 \text{ units} = \frac{100}{4} \times 60 \text{ paise}$$

$$= 1500 \text{ paise}$$

$$= 15 \text{ rupees.}$$

174. A trader allows 4% discount on the marked price and gives 1 article free on the purchase of 15 articles and still earns 35% profit. How much percentage above the cost price is the marked price?

(a) 20% (b) 10%
(c) 50% (d) 30%

Sol. (c) Let the cost price of an article be 100 units and let the marked price of article be x units
Cost of 16 articles = 16×100
Selling price of 15 articles

$$= 15 \times x \times \frac{96}{100}$$

Now by question

$$15 \times x \times \frac{96}{100} = 16 \times 100 \times \frac{135}{100}$$

Marked price = $x = 150$ units

Hence the required percentage

$$= \left(\frac{150 - 100}{100} \right) \times 100 = 50\%$$

175. The profit earned by selling a radio for Rs. 1400 is Rs. 25 more than the loss accrued on selling the radio for Rs. 1025. Find radio's cost price.

(a) 1000 (b) 900
(c) 1200 (d) 1500

Sol. (c) Let the profit be x rupees
Then, the loss = $x - 25$

So, Now by question

$$1400 - x = 1025 + x - 25$$

$$2x = 400$$

$$x = 200$$

Hence the cost price of the radio = $1400 - 200 = 1200$

176. Monu bought some lemons at the rate of 5 for Rs. 1 and other type of lemons at the rate of 8 for Rs. 1 in the same number. To earn a profit of 60% at what rate for dozen must he sell the lemons?

(a) Rs. 0.02 (b) Rs. 1.02
(c) Rs. 3.12 (d) Rs. 5.02

Sol. (c)

	Number of Lemons	Rupees
1st type	$5 \times 8 \rightarrow 1) \times 8$	
2nd type	$8 \times 5 \rightarrow 1) \times 5$	
Total	$40 + 40 = 80$	$8 + 5 = 13$

(To make equal object)

Cost of 80 lemons = Rs. 13

$$\text{Cost of 12 lemons} = \frac{12 \times 13}{80}$$

Required selling price of 12 lemons

$$= \frac{8}{5} \times \frac{12}{80} \times 13 = \text{Rs. } 3.12$$

177. Pankaj bought two cycles for Rs. 4100 and sold one at 20% profit and other at 15% loss. If the selling price of both the cycles be same. Find their selling price of each cycle.

(a) Rs. 1041 (b) Rs. 2040
(c) Rs. 1312 (d) Rs. 1204



Sol. (b) $+20\% = \frac{+1}{5}$, $-15\% = \frac{+3}{20}$

	C.P	S.P
I st Cycle	5×17	6×17

II nd Cycle	20×6	17×6
------------------------	---------------	---------------

(To make equal S.P)

	C.P	S.P
I st Cycle	85	102

II nd Cycle	120	102
------------------------	-----	-----

Total C.P = $85 + 120 = 205$ Unit

205 Unit = 4100

1 Unit = 20

Selling price of each cycle
= $102 \times 20 = 2040$

178. A trader sold his $\frac{4}{5}$ of the stock

at 15% profit and the remaining at 10% loss. If he earned Rs. 45 in the whole transaction, find the total cost price of his stock.

- (a) Rs. 450 (b) Rs. 350
(c) Rs. 300 (d) Rs. 200

Sol. (a) Percentage profit earned

$$= \frac{4}{5} \times 15\% - \left(1 - \frac{4}{5}\right) \times 10\%$$

$$= \frac{4}{5} \times 15\% - \frac{1}{5} \times 10\%$$

$$= 12\% - 2\% = 10\%$$

But $10\% = 45$

$$\Rightarrow 100\% \text{ Rs. } 450$$

Hence the cost price of the stock
= Rs. 450

179. Pankaj yadav bought 100 kg of rice for Rs. 1100 and sold it at a loss of as much money as he received for 20 kg rice. At what price did he sell the price.

- (a) Rs. 9 per kg
(b) Rs. 9.1666 kg
(c) Rs. 9.5 per kg
(d) Rs. 10.33 per kg

Sol. (b) Cost price of 1 kg rice

$$= \frac{1100}{100} = \text{Rs. } 11/\text{kg}$$

Note $\rightarrow$ The loss is covered by the sale of 20 extra kgs of rice i.e. CP of 100 kg rice = SP of 120 kg rice

$$\frac{\text{CP}}{\text{SP}} = \frac{120}{100} = \frac{6}{5}$$

According to the question,

$$6 \text{ units} = 11 \text{ Rs/kg}$$

$$1 \text{ unit} = \frac{11}{6} \text{ Rs/kg}$$

$$5 \text{ units} = \frac{11}{6} \times 5 = \frac{55}{6}$$

$$= 9.1666 \text{ Rs./kg}$$

S.P of the rice = Rs. 9.1666 Rs./kg

180. Find the selling price of goods if salesman claim to make 25% profit each, one calculating it on cost price while another on the selling price, the difference in the profits earned being Rs. 100 and selling price being the same in both the cases.

- (a) Rs. 2000 (b) Rs. 1600
(c) Rs. 2400 (d) Rs. 2500

Sol. (a) $25\% = \frac{1}{4}$

CP	4×4	3×5
SP	5×4	4×5
Profit	$+1 \times 4$	$+1 \times 5$

Note:- SP is same in both cases.

Difference in profits = $(5-4)$

= 1 unit

1 unit = Rs. 100

Selling price = $20 \times 100 = \text{Rs. } 2000$

181. Vivin goes to buy fruits and after a lot of bargaining is able to get the price of a dozen apples reduced by Rs. 1 from the initial price, there by enabling her to get 1 apple extra for every rupee saved.

(Getting no discount on the extra apples).

What is the initial price of a dozen apples.

- (a) Rs. 10 (b) Rs. 13
(c) Rs. 12 (d) Rs. 15

Sol. (c) After bargaining he enabled to save Rs.1 for which he can buy 1 apple extra.

$\therefore$ 1 apple — 1Rs. ($\because$ there is no discount on extra apple)

$\therefore$ 12 apple — 12 Rs.

182. Prakshit has two cycles and one rikshaw. The rikshaw is worth Rs. 96. If he sells the rikshaw along with the first cycle, he has an amount double that of the value of the second cycle. But if he decides to sell the rikshaw along with the second cycle, the amount received would be less than the value of first cycle by Rs. 306. What is the value of first cycle.

- (a) Rs. 900 (b) Rs. 600
(c) Rs. 498 (d) None of these

Sol. (a) Let the price of cycles by C_1 and C_2 respectively.

According to the question,

Condition (I): $96 + C_1 = 2C_2$

$$C_1 = 2C_2 - 96 \dots (i)$$

Condition (II): $96 + C_2 = C_1 - 306$

Putting the value of C_1 from equation (i)

$$96 + C_2 = 2C_2 - 96 - 306$$

$$C_2 = 96 + 96 + 306 = 498$$

$$C_1 = 2 \times 498 - 96 = \text{Rs. } 900$$

$\therefore$ Price of first cycle (C_1)

= Rs. 900

183. A orange vendor makes a profit of 20% by selling oranges at a certain price. If the charges Rs. 1.2 higher per orange they would gain 40%. Find the original price at which he sold an orange.

- (a) Rs. 5 (b) Rs. 4.8
(c) Rs. 6 (d) None of these

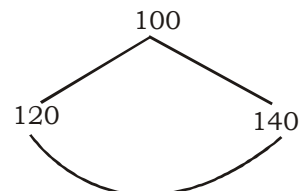
Sol. (d) By charging Rs. 1.2 more his profit become double to 40%. This means that his profit of 40% should be equal to Rs. 2.4

$$\therefore 40\% \text{ of CP} = 2.4$$

$$1\% \text{ of CP} = \frac{2.4}{40}$$

$$100\% \text{ of CP} = \frac{2.4}{40} \times 100 = \text{Rs. } 6$$

$\therefore$ Selling price = $(6 + 1.2)$
= Rs. 7.2

**Alternate:**

difference = 20 units
20 units = 1.2

$$SP (120 \text{ units}) = \frac{1.2 \times 120}{20} = 7.2 \text{ Rs.}$$

184. A man sells his goods at 25% profit. He had purchased it rupees 950 less and sold it rupees 950 less then he would gain 5% more profit. Find the initial cost price.
- (a) Rs. 5700 (b) Rs. 5800
(c) Rs. 3800 (d) Rs. 4600

Sol. (a) 25% $\frac{1 \rightarrow \text{Profit}}{4 \rightarrow \text{C.P}}$

C P SP

old $\rightarrow 4x : 5x$

According to question.

C P : S P
New $(4x-950) : (5x-950)$

$$\frac{(4x-950)}{(5x-950)} = \frac{10}{13}$$

$$\left[\therefore (25+5)\% = 30\% = \frac{3}{10} \right]$$

$$52x - 950 \times 13 = 50x - 950 \times 10$$

$$2x = 950 (13-10)$$

$$x = 475 \times 3 = 1425$$

$$\text{Cost price} = 4x = 4 \times 1425 \\ = \text{Rs. } 5700$$

Alternatively:

Note:- 1 In such type of question to save your valuable time please follow the below given formula.

$$CP = \frac{\text{Initial profit} + \text{more profit}}{\text{More profit}} \times \text{same}$$

decrease on
C.P and S.P.

2. Use this formula when the value of decrement/ increment is same

$$CP = \frac{25+5}{5} \times 950 = 6 \times 950$$

CP = Rs. 5700

185. A man sells his goods at 30% profit. had he purchased it Rs. 600 less and sold it rupees 600 less then the would gain 10% more profit find the initial CP?
- (a) Rs. 2400 (b) Rs. 3600
(c) Rs. 1200 (d) None of these

Sol. (a) 30% = $\frac{3 \rightarrow \text{Profit}}{10 \rightarrow \text{CP}}$

C P SP

old $\rightarrow 10x : 13x$

According to question,

C P SP

New $\rightarrow (10x-600) : (13x-600)$

$$\frac{(10x-600)}{(13x-600)} = \frac{5}{7}$$

$$\left[(30+10)\% = 40\% = \frac{2 \rightarrow \text{Profit}}{5 \rightarrow \text{CP}} \right]$$

$$S.P = 7$$

$$70x - 4200 = 65x - 3000$$

$$5x = 1200$$

$$x = 240$$

$$\text{Cost price} = 10x = 10 \times 240 = \text{Rs. } 2400$$

Alternate:

$$CP = \frac{(30+10)}{10} \times 600$$

$$CP = \text{Rs. } 2400$$

186. A shopkeeper gives 1 article free at the purchase of 15 article and he also offer a discount of 4% to customer and he still gains 35% profit then find the ratio of cost price to mark price?
- (a) 2:3 (b) 3:4
(c) 3:2 (d) None of these

Sol. (a) Note:- In such type of questions follow the given method below to save your valuable time.

	CP	MP
	(100-Discout)	(100+Profit)
	(100-4)%	(100+35)%
Total number of article	$\frac{96}{16}$	$\frac{135}{15}$
Ratio of cost	6	9
of 1 article	2	3

$$\text{ratio of CP : MP} = 2:3$$

187. A shopkeeper gives 4 articles free at the purchase of 12 articles and he also offers a discount of 20% to customer and he still gains 20% profit then find the ratio of their cost price and marked price?

- (a) 1:2 (b) 2:1
(c) 3:1 (d) None of these

Sol. (a)

$$\begin{array}{l} CP : MP \\ (100-20) : (100+20) \end{array}$$

$$\frac{80}{16} : \frac{120}{12}$$

$$\begin{array}{l} \text{Total number of article} \\ \leftarrow \frac{80}{16} : \frac{120}{12} \end{array}$$

$$\begin{array}{l} \text{Ratio of cost of 1 article} \\ \leftarrow 5 : 10 \end{array}$$

$$\Rightarrow 1:2$$

188. A man sells a table at 12% loss and a book on 19% profit then he earns a profit of rupees 160 but if he sell the table at 12% profit and book at 16% loss then he bears a loss of 40 rupees. Find the price of book.
- (a) Rs. 4000 (b) Rs. 3000
(c) Rs. 2000 (d) Rs. 3500

Sol. (a) Let the cost price of a table and a book is Rs. T and B respectively

According to question,

$$-12\%T + 19\%B = 160$$

$$12\%T - 16\%B = -40$$

$$\text{On adding, } 3\%B = 120$$

$$B = \frac{120}{3} \times 100 = 4000$$

$$\text{Cost of book} = \text{Rs. } 4000$$

(Note:- The value of loss should be written with negative sign.)

189. A man sells a table at 15% profit and chair at -12% loss then he earns a profit of 540 rupees and if he sell the table at 12% loss and chair at 15% profit then he bears no loss and no profit then find the price of table and chair?
- (a) Rs. 10000, Rs. 8000
(b) Rs. 12000, Rs. 6000
(c) Rs. 8000, Rs. 12000
(d) None of these

Sol. (a) Let the price of a table and chair is Rs. T and C.

According to the question,



$$15\%T - 12\%C = 540 \dots (i)$$

$$-12\%T + 15\%C = 0 \dots (ii)$$

On adding, Equation (i) and (ii)

$$3\%T + 3\%C = 540$$

$$T + C = 18000 \dots (iii)$$

On subtraction

[equation (i) - equation (ii)]

$$27\%T - 27\%C = 540$$

$$T - C = 2000 \dots (iv)$$

from equation (iii) and (iv),

$$\text{Cost of table} = \frac{18000 + 2000}{2}$$

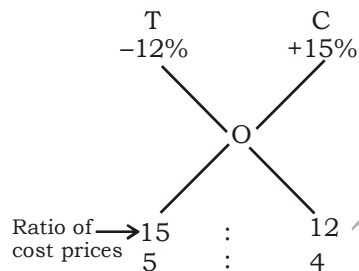
$$= \text{Rs. } 10,000$$

$$\text{Cost of chair} = \frac{18000 - 2000}{2}$$

$$= \text{Rs. } 8000$$

Alternate:-

By allegation rule,



Let price of table = 500 and chair = 400

T 500 (Profit) ↓ 15% 75	A 400 (loss) ↓ 12% 48
----------------------------------	--------------------------------

Profit = (75 - 48) = 27 units

$$27x = 540$$

$$x = 20$$

$$\text{Cost price of table} = 20 \times 500$$

$$= \text{Rs. } 10,000$$

$$\text{Cost price of chair} = 400 \times 20$$

$$= \text{Rs. } 8000$$

190. A trader bought 10 kg of apples for Rs. 405 out of which 1 kg of apples were found to be rotten. If he wishes to make a profit of

10%, at what rate should he sell the remaining apples per kg?

- (a) Rs. 45 (b) Rs. 49.50
(c) Rs. 50 (d) Rs. 51

Sol. (b) Profit = 10% = $\frac{1}{10} \rightarrow \text{profit}$
 $\frac{1}{10} \rightarrow \text{C.P}$

CP 10 ↓ ×40.5 405	SP 11 ↓ ×40.5 445.5
----------------------------	------------------------------

i.e., selling price = Rs. 445.5

& remaining apples = 10 - 1 = 9 kg

∴ Selling price of remaining apples per kg

$$= \frac{445.5}{9} = \text{Rs. } 49.50$$

191. An item costing Rs. 840 was sold by a shopkeeper to a buyer at a gain of 10% and it was again sold by the buyer to the new buyer at a loss of 5%. The final price of the item is:

- (a) Rs. 877.80 (b) Rs. 798
(c) Rs. 924 (d) Rs. 37.80

Sol. (a) C.P of first buyer = Rs. (840 + 10% of 840) = Rs. 924
Now, this item is sold to the second buyer at 5% loss
∴ Final selling price = Rs. (924 - 5% of 924) = Rs. (924 - 46.20) = Rs. 877.80

Alternate:

Apply successive

$$5\% = \frac{1}{20}$$

10% Initial 10 20 200 ↓ ×4.2 840	$\frac{1}{10}$ Final 11 19 209 ↓ ×4.2 877.8
--	---

192. If the profit per cent got on selling an article is numerically equal to its cost price in rupees and the selling price is Rs. 39, then cost price (in Rs.) will be:

- (a) 20 (b) 22
(c) 28 (d) 30

Sol. (d) **Note:-** for detailed solution check earlier question of same type.

Given, S.P. = Rs. 39

Now go through the options

Option (a). C.P. = 20

∴ S.P = 20 + 20% of

$$20 = 24 \neq 39$$

Option (d). C.P. = 30

∴ S.P. = 30 + 30% of 30

$$= 39 = \text{Given S.P.}$$

i.e., option (d) is the required answer.

[Note: option (b) & (c) given S.P. ≠ Integer]

193. The difference between the selling price and cost price of an article is Rs. 210. If the profit percent is 25, then the selling price of the article is:

- (a) Rs. 950 (b) Rs. 1,050
(c) Rs. 1,150 (d) Rs. 1,250

Sol. (b) Given, S.P - C.P = 210

$$\text{Profit} = 25\% = \frac{1}{4} \rightarrow \text{Profit}$$

$$\frac{1}{4} \rightarrow \text{C.P}$$

$$\Rightarrow \text{S.P} = 4 + 1 = 5$$

$$\therefore \text{S.P} - \text{C.P} = 5 - 4 = 1$$

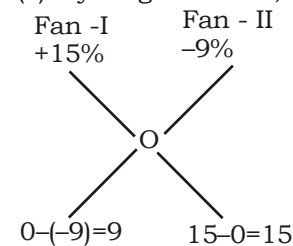
i.e., 1 unit = Rs. 210

$$5 \text{ units} = 5 \times 210 = \text{Rs. } 1050$$

194. A man purchase two fans of Rs. 2,160. By selling one fan at a profit of 15% and the other at a loss of 9% he neither gains nor losses in the whole transaction. Find the cost price of each fan in Rs. :

- (a) 710, 1450 (b) 1530, 630
(c) 810, 1350 (d) 1340, 820

Sol. (c) By allegation rule,



i.e., C.P of I- Fan: C.P of II- Fan = 9:15 = 3:5

$$\text{Cost price of first fan} = \frac{2160}{8} \times 3$$

$$= \text{Rs. } 810$$

$$\text{Cost price of IInd fan} = \frac{2160}{8} \times 5$$

$$= \text{Rs. } 1350$$



195. Profit after selling a commodity for Rs. 524 is the same as loss after selling it for Rs. 452. The cost price of the commodity is:

- (a) Rs. 480 (b) Rs. 500
(c) Rs. 488 (d) Rs. 485

Sol. (c) Let the C.P of the commodity = Rs. x

According to the question,

$$524 - x = x - 452$$

$$\text{or } 2x = 524 + 452$$

$$\text{or } 2x = 976$$

$$\text{or } x = \frac{976}{2} = 488$$

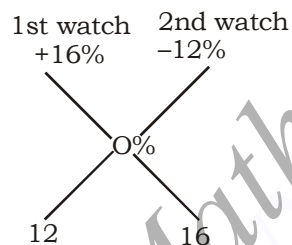
i.e. required CP = Rs. 488

Note:- for alternate method check earlier questions of same type.

196. The total cost price of two watches is Rs. 840. One is sold at a profit of 16% and the other at a loss of 12 per cent. There is no loss or gain in the whole transaction. The cost price of the watch on which the shopkeeper gains, is.

- (a) Rs. 360 (b) Rs. 370
(c) Rs. 380 (d) Rs. 390

Sol. (a) By alligation rule



$$\text{i.e. } \frac{\text{C.P of 1st watch}}{\text{C.P of 2nd watch}} = \frac{12}{16} = \frac{3}{4}$$

$$\therefore \text{C.P. of 1st watch} = \frac{3}{7} \times 840 = \text{Rs. 360}$$

197. By selling 14 watches of equal cost price at the rate of Rs. 450 each, there is a profit equal to the cost price of 4 watches. The cost price of a watch is:

- (a) Rs. 350 (b) Rs. 360
(c) Rs. 375 (d) Rs. 400

Sol. (a) Let C.P of each watch = Rs. 1
 $\therefore$ Profit = C.P. of 4 watches = Rs. 4

& C.P of watches = Rs. 4

$\therefore$ S.P of 14 watches = Profit +

C.P of 14 watches = 4 + 14 = 18

but, the given S.P of 14 watches = Rs. 450 $\times$ 14

i.e., 18 units = 450 $\times$ 14

$$\therefore 1 \text{ unit} = \frac{450}{18} \times 14 = 350$$

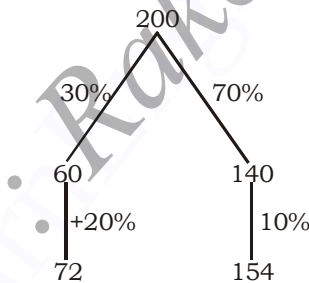
i.e., C.P. of each watch = Rs. 350

198. A shopkeeper bought 200 articles, each costing the same. He sold 30% of the articles at 20% profit and remaining at 10% profit. If the total profit made by him is Rs. 2600, find the cost price of one article.

(a) Rs. 200 (b) Rs. 1300

(c) Rs. 100 (d) Rs. 2600

Sol. (c) Let each article costs Rs. 1
 $\Rightarrow$ cost of 200 articles = Rs. 200



$$\Rightarrow \text{Total SP} = 154 + 72 = 226$$

$$\Rightarrow \text{Profit} = 226 - 200 = 26$$

$$\Rightarrow 26 \longrightarrow 2600$$

$$\Rightarrow 1 \longrightarrow 100$$

$$\Rightarrow \text{cost price of each article} = \text{Rs. 100}$$

199. A shopkeeper bought two cycles in Rs. 1600. He sold first cycle at 10% profit and second at 20%. If he sold first cycle at 20% profit and the second at 10% profit he got Rs. 5 more. The price of both the cycles.

- (a) Rs. 825 and Rs. 775
(b) Rs. 600 and Rs. 1000
(c) Rs. 900 and Rs. 700
(d) Rs. 850 and Rs. 750

Sol. (a) $10\% = \frac{1}{10}$ and $20\% = \frac{1}{5}$

Let price of 1st cycle = Rs. C_1

& that of 2nd Cycle = Rs. C_2

$$\therefore \frac{1}{10} C_1 + \frac{1}{5} C_2 = \text{profit} \quad \dots\dots(i)$$

$$\text{and } \frac{1}{5} C_1 + \frac{1}{10} C_2 = \text{Profit} + 5 \quad \dots\dots(ii)$$

By (i) - (ii), we get

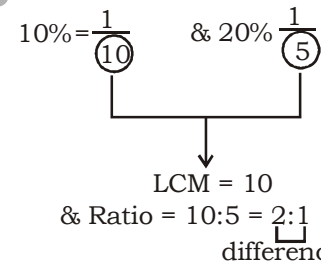
$$C_1 - C_2 = 5 \times 10 = 50 \quad \dots\dots(iii)$$

$$\text{and given, } C_1 + C_2 = \text{Rs. 1600} \quad \dots\dots(iv)$$

on solving, (iii) and (iv), we get

$$C_1 = 825 \text{ \& } C_2 = 775$$

short-cut: When both are sold at certain profit.



$$\therefore \text{Difference of prices} = C_1 - C_2$$

$$= \frac{\text{LCM} \times \text{profit difference}}{\text{Difference of ratio}} = \frac{10 \times 5}{1} = 50$$

& given, $C_1 + C_2 = 1600$

on solving the above equations, we get C_1 or $C_2 = 825/- = 775/-$

200. Nishant sells a pen at 5% Loss and a book at 15% profit, he gets Rs. 7 as a profit. If he sells the pen at 5% profit and the book at 10% profit, he gets Rs. 6 more. The prices of book and pen respectively are:

- (a) Rs. 100, Rs. 80
(b) Rs. 70, Rs. 90
(c) Rs. 70, Rs. 110
(d) Rs. 80, Rs. 100

Sol. (d) According to the question,

Pen + Book Profit

$$-5\% + 15\% = 7 \quad \dots\dots(i)$$

$$+5\% + 10\% = 7 + 6 = 13 \quad \dots\dots(ii)$$

By (i) + (ii), we get,

$$25\% \text{ of book} = 7 + 13 = 20$$

$$\Rightarrow \frac{1}{4} \text{ of book} = 20$$

$$\Rightarrow \text{Price of book} = 80$$



∴ 10% of book = 10% of 80 = Rs. 8

∴ from (ii)

5% of pen + 10% of book = 13

5% of pen + 8 = 13

⇒ $\frac{1}{20}$ of pen = 5

⇒ price of pen 20×5 = Rs. 100

i.e., price of book = Rs. 80 & that of pen = Rs. 100

201. Profit on selling 10 candles equals selling price of 3 pens. While loss on selling 10 pens equals selling price of 4 candles. Also profit percentage equal to the loss percentage and cost of a candles is half of the cost of a pen. what is the ratio of selling price of candle to the selling price of a pen?

- (a) 5:4 (b) 3:2
(c) 4:5 (d) 3:4

Sol. (b) Let S.P of one Candle is m and S.P of pen is n

Cost price of candle = x

Cost price of pen = $2x$

According to the question.

$$\frac{3n}{10x} \times 100 = \frac{4m}{20x} \times 100$$

$$\frac{3n}{10x} = \frac{4m}{20x}$$

$$6n = 4m$$

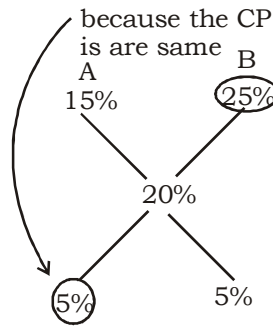
$$\frac{m}{n} = \frac{6}{4} = \frac{3}{2}$$

$$m:n = 3:2$$

202. Cost price of two motorcyces is same one is sold at a profit of 15% and the other for Rs. 4800 more than the first. If the net profit is 20%. Find the cost price of each motorcyle?

- (a) Rs. 48000 (b) Rs. 52000
(c) Rs. 36000 (d) Rs. 42500

Sol. (a)



	CP	SP
A	100	115
B	100	125

10 units = units = 4800

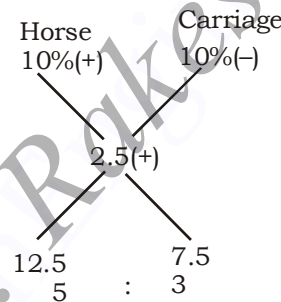
100 units = 48000

CP of each cycle = Rs. 48,000

203. A horse and a carriage together cost Rs. 8,000. If by selling the horse at a profit of 10% and the carriage at a loss of 10% a total profit of 2.5% is made, then what is the cost price of the horse?

- (a) Rs. 3,000 (b) Rs. 3,500
(c) Rs. 4,000 (d) Rs. 5,000

Sol. (d)



$$CP \text{ of horse} = 8000 \times \frac{5}{8} = 5000$$

C.P. of horse = Rs. 5000

204. Pankaj calculates his profit percentage at selling price where as Nishant calculates his profit on the cost price. They find that the difference of their profits is Rs. 275. If the selling price of both of them are the same, and pankaj gets 25% profit and Nishant gets 15% profit, then find their selling price.

- (a) Rs. 2,100 (b) Rs. 2,300
(c) Rs. 2,350 (d) Rs. 2,250

Sol. (b) $25 = \frac{1 \rightarrow \text{Profit}}{4 \rightarrow \text{SP}}$

$$15 = \frac{3 \rightarrow \text{Profit}}{20 \rightarrow \text{CP}}$$

According to the question,

Pankaj Nishant

$$CP \rightarrow 3 \times_{23} : 20 \times_{4}$$

$$SP \rightarrow 4 \times_{23} : 23 \times_{4}$$

$$\text{Profit} \rightarrow 1 \times_{23} : 3 \times_{4}$$

Note:- SP is same so equal both
SP's Difference in profits = 23-12 = 11 units

11 units = 275 (given)

1 unit = 25

Selling price of each = 92×25
= Rs. 2300

205. In a cricket match a contractor signs a contract of giving food for 24 players and decides to take a

profit of $12\frac{1}{2}\%$ on the cost of

food. 3 players found absent and remaining paid there bill. But a contractor suffers a loss of 30 rupees. Find the money which is paid by a player.

- (a) ₹ 75 (b) ₹ 80
(c) ₹ 100 (d) ₹ 90

Sol. (d) Profit = $12\frac{1}{2}\% = \frac{1}{8}$

Note:- Assume any value which is helpful for calculation.

Let initially amount paid by players = 64 units.

New amount = 72 units.

Initially : New

Amount → 64 : 72

24 players pays = 72

1 player pays = 3

21 player pays = $21 \times 3 = 63$ units

Loss = $(64 - 63) = 1$ unit

1 unit = Rs. 30

Amount paid by 1 player = 30×3
= ₹ 90

206. A dealer sold 600 quintals of sugar at a profit of 7%. If a quintal of sugar cost him Rs. 1600, find his total profit and the selling price:

- (a) 67200, 12072
(b) 67000, 102720
(c) 67200, 1027200
(d) None of these



Sol. (c) Cost price of sugar
= 1600×600

= Rs. 9,60,000

Rate of profit = 7%

$$\text{Profit} = \frac{9,60,000}{100} \times 7 = 67200$$

∴ Selling price = Cost price + profit

$$\text{SP} = 9,60,000 + 67200$$

$$= \text{Rs. } 10,27,200$$

207. By selling a colour TV for RS. 23520, a dealer suffers a loss of 4%. At what price should he sell it to gain 8%?

(a) Rs. 26460

(b) Rs. 26450

(c) Rs. 25460

(d) None of these

Sol. (a) Selling price of colour TV

$$= \text{Rs. } 23520$$

Loss percentage = 4%

Cost price of the T.V.

$$= \frac{23520}{96} \times 100 = 24500$$

Profit % = 8%

New selling price

$$= \frac{24500 \times 108}{100} = \text{Rs. } 26,460$$

Alternate:

Let CP = 100 units

∴ SP = 96 units

96 units → 23520

$$1 \text{ unit} \rightarrow \frac{23520}{96} = 245$$

$$\begin{aligned} \text{SP (108 units)} &= 245 \times 108 \\ &= \text{Rs. } 26460 \end{aligned}$$

208. If the marked price of an article is Rs. 450 and markup percentage is 12.5%. What is the cost price?

(a) 400 (b) 408

(c) 300 (d) 430

Sol. (a) Marked price = Rs. 450

$$\text{Markup percentage} = 12.5\% = \frac{1}{8}$$

$$\begin{array}{ccc} \text{CP} & : & \text{MP} \\ 8 & : & 9 \\ \downarrow \times 50 & & \downarrow \times 50 \\ 400 & & 450 \end{array}$$

Note:- Always remember markup is calculated on the basis of CP while discount is calculated on the basis of MRP?

209. The percent profit made when an article is sold for Rs. 56 is thrice as when it is sold for Rs. 42. The cost price of the article is:

(a) Rs. 48 (b) Rs. 49

(c) Rs. 50 (d) Rs. 35

Sol. (d) Let the cost price of the article

Case 1:- Profit = $(56 - x)$

Case 2: Profit = $(42 - x)$

According to the question,

$$\frac{(56 - x)}{x} \times 100 = \frac{(42 - x)}{x} \times 100 \times 3$$

$$56 - x = 126 - 3x$$

$$2x = 70$$

$$x = 35$$

Cost price of the article = Rs. 35

Alternate:

$$\begin{array}{ccc} \text{Sp}_1 & : & \text{Sp}_2 \\ 56 & : & 42 \\ \downarrow & & \downarrow \\ \text{Profit} \rightarrow 3 & : & 1 \\ & & \downarrow \\ & & +2 \end{array}$$

$$2 \text{ units} = 14$$

$$1 \text{ unit} = \frac{14}{2} = 7$$

$$3 \text{ units} = 3 \times 7 = 21$$

$$\text{CP} = \text{SP} - \text{Profit} = 42 - 7 = \text{Rs. } 35$$

or

$$\text{CP} = 56 - 21 = \text{Rs. } 35$$

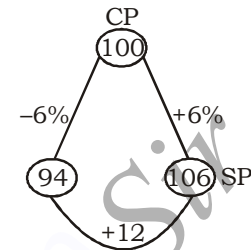
210. If gift pack is sold at a gain of 6% instead of at a loss of 6%, then the seller gets Rs. 6 more. Then cost price of the gift pack.

(a) Rs. 60 (b) Rs. 66

(c) Rs. 50 (d) Rs. 36

Sol. (c) Let the cost price = 100 units

According to the question,



$$12 \text{ units} = 6$$

$$1 \text{ unit} = \frac{6}{12} = \frac{1}{2}$$

Cost price of the article

$$= \frac{1}{2} \times 100 = \text{Rs. } 50$$

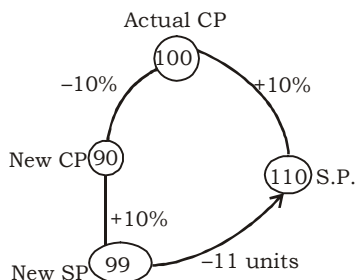
211. A man sells a bicycle at a gain of 10%. If he had bought it at 10% less and sold it for Rs. 132 less, he would have still gained 10%. The cost price of the bicycle.

(a) Rs. 1000 (b) Rs. 1200

(c) Rs. 1500 (d) Rs. 1320

Sol. (b) Let the cost price of the bicycle = 100

According to the questions,



$$11 \text{ units} = 132$$

$$1 \text{ unit} = \frac{132}{11} = 12$$

$$\text{Actual CP (100 units)} = 12 \times 100 = 1200$$

212. An article costing Rs. 600 is being sold at 20% loss. If the price is further reduced by 12.5%, the selling price will be:

(a) Rs. 400 (b) Rs. 380

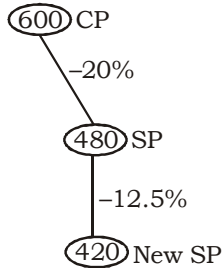
(c) Rs. 420 (d) Rs. 525



Sol. (c) CP of the article = Rs. 600

$$\text{Loss \%} = 20\%$$

According to the question,



New SP = Rs. 420

Alternate : Let SP = Rs. x

$$20\% \frac{1}{5}, 12.5\% = \frac{1}{8}$$

$$\Rightarrow x \times 600 \times \frac{4}{5} \times \frac{7}{8} \Rightarrow \text{Rs. } 420$$

213. By selling 5 articles for Rs. 15, a man makes a profit of 20%. Find his gain or loss percentage if he sells 8 articles for Rs. 18.4?

- (a) 10% profit (b) 8% loss
(c) 8% profit (d) 10% loss

Sol. (b) S.P. of 1 articles = $\frac{15}{5} = \text{Rs. } 3$

$$\text{C.P. of 1 articles} = \frac{3}{120} \times 100$$

$$= \text{Rs. } 2.5$$

$$\text{C.P. of 8 articles} = 2.5 \times 8 = \text{Rs. } 20$$

$$\text{S.P. of 8 articles} = \text{Rs. } 18.4$$

$$\text{Loss} = (20 - 18.4) = \text{Rs. } 1.6$$

$$\% \text{ loss} = \frac{1.6}{20} \times 100 = 8\% \text{ loss}$$

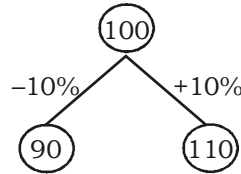
214. A dishonest business man professes to sell his articles at cost price but he uses false weights with which he cheats by 10% while buying and By 10% while selling. Find his percentage profit?

- (a) $8\frac{1}{3}\%$ (b) $12\frac{1}{3}\%$

- (c) $22\frac{2}{9}\%$ (d) $6\frac{2}{3}\%$

Sol. (c) Let the initial quantity of an article is 100gm and the cost price of 1gm is Rs. 1

According to the question



$$\% \text{ Profit} = \frac{20}{90} \times 100$$

$$= \frac{200}{9} = 22\frac{2}{9}\% \text{ Profit}$$

215. By selling 15 mangoes a fruit vendor recovers the cost price of 20 mangoes. Find the profit percentage?

- (a) $12\frac{1}{2}\%$ (b) $11\frac{1}{2}\%$
(c) $22\frac{1}{2}\%$ (d) $33\frac{1}{3}\%$

Sol. (d) 15 S.P = 20 c.p.

$$\frac{\text{C.P.}}{\text{S.P.}} = \frac{15}{20} = \frac{3}{4}$$

$$\% \text{ Profit} = \frac{1}{3} \times 100$$

$$= 33\frac{1}{3}\%$$

216. A shopkeeper sold a Article Rs. 6900 He gains 15% profit. If cost price and S.P Increases 30% and 20% respectively Now, calculate profit%.

- (a) 6.15% (b) 6.23%
(c) 6% (d) 6.13%

Sol. (a) $15\% = \frac{3}{20}$ CP=20 SP=23

A.T.Q.

$$23 \text{ units} = \text{Rs. } 6900$$

$$1 \text{ units} = 300$$

$$20 \text{ units} = 300 \times 20 = 6000$$

$$\text{C.P.} = \text{Rs. } 6000$$

	C.P	S.P
Old	6000	6900
	+30%	+20%
New	7800	8280

$$\% \text{ Profit} = \frac{480}{7800} \times 100$$

$$= 6.15\%$$

217. A music system when sold for Rs. 4500 given a loss of 16.66% to the merchant who sells it calculate his loss or gain percentage. If he sells it for Rs. 5703.75.

- (a) Profit of 5.625%
(b) Loss of 5.625%
(c) Profit of 3.625%
(d) Loss of 4.625%

Sol. (a) $16.66\% = \frac{1}{6}$

C.P	S.P
6	5
$\downarrow \times 900$	$\downarrow \times 900$
5400	4500

$$\text{New sp} = 5703.75$$

$$\text{Profit} = 5703.75 - 5400$$

$$= \text{Rs. } 303.75$$

$$\% \text{ Profit} = \frac{303.75}{5400} \times 100$$

$$= 5.625\%$$

218. A shopkeeper bought 240 chocolates at Rs 9 per dozen. If he sold all of them at Rs. 1 each what was his profit percent?

- (a) $66\frac{2}{3}\%$
(b) $33\frac{1}{3}\%$
(c) 23%
(d) 25%

Sol. (b) C.P. of chocolates = $\frac{240}{12} \times 9$

$$= \text{Rs. } 180$$

$$\text{S.P.} = 240 \times 1 = \text{Rs. } 240$$

$$\% \text{ Profit} = \frac{240 - 180}{180} \times 100$$

$$= \frac{60}{180} \times 100 = 33\frac{1}{3}\%$$



219. The marked price of a table is Rs. 1200, while 20% above the cost price. It is sold at a discount of 10% on the marked price. Find the profit percentage

- (a) 16% (b) 8%
(c) 7.5% (d) 10%

Sol. (b) A.T.Q.

C.P.	S.P.	M.P.
1000	1080	1200

$$\therefore \text{C.P.} = \frac{1200}{120} \times 100 = \text{Rs. } 1000$$

$$\text{S.P.} = 1200 \times \frac{(100 - 10)}{100} = \text{Rs. } 1080$$

$$\% \text{ Profit} = \frac{80}{1000} \times 100 = 8\%$$

220. A buys an article for Rs. 120 and sells it to B at a profit of 25%. B sells it to C who sells it for Rs. 198, making a profit of 10% what profit percentage did B make?

- (a) 20% (b) 16.66%
(c) $33\frac{1}{3}\%$ (d) 17%

Sol. (a) C.P. for B = $120 \times \frac{125}{100}$
= Rs. 150

$$\text{C.P. for C} = \frac{198}{110} \times 100 = \text{Rs. } 180$$

$$\text{C.P. for C would be the selling price of B profit} = (180 - 150) = \text{Rs. } 30$$

$$\% \text{ Profit} = \frac{30}{150} \times 100 = 20\%$$

221. A woman sells 5 articles for Rs. 15 and makes a profit of 20%. Find his gain or loss percent if he sells 8 such articles for Rs. 16.

- (a) 8% gain (b) 20% loss
(c) 20% gain (d) 8% loss

Sol. (b) C.P. of 1 article = $\frac{15}{5} \times \frac{100}{120}$

$$= \text{Rs. } 2.5$$

$$\text{C.P. of 8 articles} = 2.5 \times 8 = \text{Rs. } 20$$

$$\text{SP of 8 articles} = \text{Rs. } 16$$

$$\% \text{ loss} = \frac{(20 - 16)}{20} \times 100 = 20\%$$

222. The cost of manufacturing an article is made up of materials, labour and overheads in the ratio 4:3:2. If the cost of labour is Rs. 45. Find the profit percent. If the article is sold for Rs. 180.

(a) $16\frac{2}{3}\%$ (b) $66\frac{2}{3}\%$

(c) 52% (d) $33\frac{1}{3}\%$

Sol. (d) Ratio of cost manufacturing

Material	Labour	Overheads	Total cost
4	3	2	
$\downarrow \times 15$	$\downarrow \times 15$	$\downarrow \times 15$	
(60)	45	(30)	= 135

$$\% \text{ Profit} = \frac{(180 - 135)}{135} \times 100$$

$$= \frac{45}{135} \times 100 = 33\frac{1}{3}\%$$

223. A trader sells two bullocks for Rs. 8400 each neither losing nor gaining in total. If he sold one of the bullocks at a gain of 20% the other is sold at a loss of?

(a) $14\frac{2}{7}\%$ (b) $16\frac{2}{3}\%$

(c) 20% (d) 5%

Sol. (a) A.T.Q.

A	B	Total
CP $\rightarrow$	5 + x	5 + x
+20% $\downarrow$		
SP $\rightarrow$	6 + 6	= 12

$$5 + x = 12 \text{ Because there is no profit no loss } x = 7$$

$$\text{Then loss is} = 7 - 6 = 1$$

$$\therefore \text{Loss}\% = \frac{1}{7} \times 100 = 14\frac{2}{7}\%$$

224. Goutam yadav earns 15 percent on an investment but loses 10 percent on another investment. If the ratio of two investments is 3:5, then the combined loss percent is.

(a) $\frac{3}{7}\%$ (b) $\frac{7}{3}\%$

(c) $\frac{5}{8}\%$ (d) $\frac{8}{5}\%$

Sol. (c) A.T.Q.

Investment Ratio

Let A = 300

B 500

$$\begin{matrix} A : B \\ 3 : 5 \end{matrix}$$

$$\begin{matrix} 15\% \text{ earn} & 300 + 500 = 800 & 10\% \text{ loss} \\ & \downarrow & \downarrow \\ & 345 + 450 = 795 & \end{matrix} \quad \begin{matrix} 5 \text{ unit} \\ \text{loss} \end{matrix}$$

$$\text{So loss}\% = \frac{5}{800} \times 100 = \frac{5}{8}\%$$

225. From 2014 to 2015, the sales of a book decreased by 80%. If the sales in 2016 were the same as in 2014, by what percent did it increase from 2015 to 2016?

- (a) 113% (b) 100%
(c) 300% (d) 400%

Sol. (d) A.T.Q.

$$\begin{matrix} \frac{2014}{100} & \frac{2015}{20} & \frac{2016}{100} \\ & \downarrow -80\% & \downarrow +80\% \end{matrix}$$

$$\text{So increase} = \frac{80}{20} \times 100 = 400\%$$

226. Pooja sold an article at 20% profit on the selling price. when the cost price reduced by 10%. His percentage of profit/ loss on cost price will be if he also reduced the selling price by 10%.

- (a) 20% profit (b) 25% profit
(c) 25% loss (d) 22% profit

Sol. (b) 20% Profit on S.P means = $\frac{1}{5}$

$$20\% \text{ Profit} = \frac{10 \rightarrow \text{Profit}}{50 \rightarrow \text{SP}}$$

$$\therefore \text{C.P.} = \text{S.P.} - \text{Profit}$$

$$\text{C.P.} = 50 - 10 = 40$$

$$\begin{matrix} \text{CP} & \text{SP} \\ 40 & 50 \end{matrix}$$

$$\begin{matrix} -10\% \downarrow & -10\% \downarrow \\ 36 & 45 \end{matrix}$$

$$\begin{matrix} \text{New CP} & \text{New SP} \end{matrix}$$

$$\swarrow \searrow$$

$$9 \text{ units profit}$$



$$\therefore \text{Profit\%} = \frac{\text{profit}}{\text{cp}} \times 100$$

$$= \frac{9}{36} \times 100 = 25\% \text{ profit}$$

227. A radio merchant sold half of his radio at 40% loss. Half of remaining at 40% profit and the rest was sold at the cost price. In the total transaction his gain or loss will be

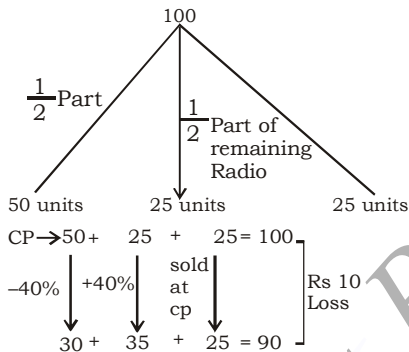
- (a) 10% gain (b) 10% loss
(c) 12% loss (d) 13% loss

Sol. (a) Let the total no. of Radio = 100 units

C.P. of 1 unit Radio = Rs. 1

C.P. of 100 units Radio are = $1 \times 100 = \text{Rs. } 100$

A.T.Q.



$$\text{Loss} = \frac{10}{100} \times 100 = 10\% \text{ Loss}$$

228. Suresh buys 100 cups at Rs. 10 each on the way if 20 cups are broken. He sells the remaining cups at Rs. 11 each. His loss percent is.

- (a) 12% (b) 11%
(c) 15% (d) $16\frac{2}{3}\%$

Sol. (a) A.T.Q

C.P. of 1 cup = Rs. 10

C.P. of 100 cups = $100 \times 10 = \text{Rs. } 1000$

Now 20 cups are broken
means = $100 - 20 = 80$ cups
S.p. of 1 cup is = Rs 11
S.P. of 80 cups are = $11 \times 80 = \text{Rs. } 880$
 $\therefore \text{Loss} = \text{C.P.} - \text{S.P.}$
 $= 1000 - 880 = 120$

$$\text{Loss\%} = \frac{\text{Loss}}{\text{cp}} \times 100 = \frac{120}{1000} \times 100 = 12\%$$

229. The cost price of two dozen bananas is Rs. 32 after selling 18 bananas at the rate of Rs. 12 per dozen the shopkeeper reduced rate Rs. 4 per dozen. The percent loss is.

- (a) $16\frac{2}{3}\%$ (b) $31\frac{1}{4}\%$
(c) 28% (d) $33\frac{1}{3}\%$

Sol. (b) A.T.Q

C.P. of 2 dozen bananas (24 bananas) is = Rs. 32

S.P. of 1 dozen bananas (12 bananas) is Rs. 12

S.P. of 18 bananas is = Rs. 18

$\therefore$ Now shopkeeper reduced to the rate Rs. 4/ dozen

So, S.P of 1 dozen bananas is Rs. 8

$$\text{S.P of One banana} = \frac{8}{12} = \frac{2}{3}$$

$$\text{Remaning bananas} = 6 \times \frac{2}{3} = 4$$

$\therefore$ SP of total 24 bananas is (2 dozens) is

$$= \text{Rs. } 18 + 4 = 22$$

$$\text{Loss} = \text{C.P.} - \text{S.P.}$$

$$= 32 - 22 = \text{Rs. } 10$$

$$\text{Loss} = \frac{10}{32} \times 100 = 31\frac{1}{4}\%$$

230. A book seller bought 200 text books for Rs. 12,000. He wanted to sell them at a profit so that he got 20 books free. At what profit percent should he sell them?

- (a) 10% (b) 20%
(c) $9\frac{1}{11}\%$ (d) $16\frac{2}{3}\%$

Sol. (a) A.T.Q

C.P. of 200 books = 12000

$$\text{C.P. of 1 book} = \frac{12000}{200} = 60$$

= Rs.60

To get 20 books free

$$\text{Profit} = 20 \times 60 = 1200$$

$$\text{Profit} = \frac{1200}{12000} \times 100 = 10\%$$

231. A radio seller bought 300 radio for Rs. 18,000. he wanted to sell them at a profit so that he got 40 radios free. At what profit percent should he sell them?

- (a) 13% (b) $37\frac{1}{2}\%$
(c) $333\frac{1}{3}\%$ (d) $13\frac{1}{3}\%$

Sol. (d) A.T.Q

C.P. of 300 radio = 18,000

$$\text{C.P. of 1 radio} = \frac{18,000}{300} = 60$$

To get 40 books free

$$\text{Profit} = 40 \times 60 = 2400$$

$$\text{Profit \%} = \frac{2400}{18,000} \times 100$$

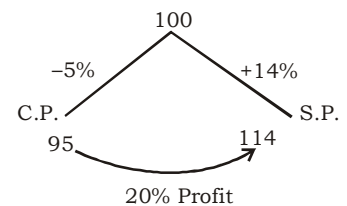
$$= \frac{40}{3} = 13\frac{1}{3}\%$$

232. Rakesh bought an article, paying 5% less than the original price. Rakesh sold it with 20% profit on the price he had paid. What percent of profit did Rakesh earn on the original price?

- (a) 11% (b) 14%
(c) 12% (d) $12\frac{1}{2}\%$

Sol. (b) A.T.Q

Let original price = 100



$$\text{Profit} = 114 - 100 = 14\%$$



233. I purchased 120 exercise books at the rate of Rs. 3 each and sold

$\frac{1}{3}$ of them at the rate of Rs. 4

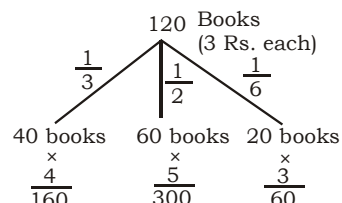
each $\frac{1}{2}$ of them at the rate of Rs.

5 each and the rest at the cost price my profit percent was

(a) 2 (b) $44\frac{4}{9}\%$

(c) 3 (d) 1

Sol. (b) A.T.Q



C.P. = 360

S.P. = 160 + 300 + 60 = 520

Profit = 520 - 360 = 160

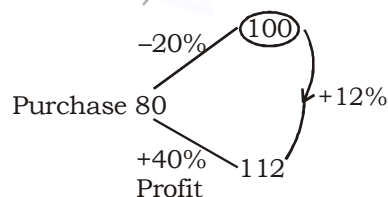
Profit% = $\frac{160}{360} \times 100 = 44\frac{4}{9}\%$

234. Radha bought a camera and paid 20% less than its original price. He sold it at 40% profit on the price he had paid. The percentage of profit earned by Radha on the original price was.

(a) 12% (b) 13%

(c) +14% (d) $13\frac{1}{3}\%$

Sol. (a) Let C.P. of the camera = 100 unit



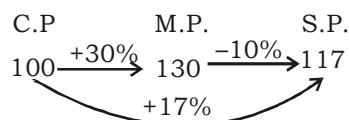
So, 12% Profit

235. A shopkeeper fixes the price of an article at 30% higher than its actual cost. If he sells it at 10% discount on marked price then the profit is

(a) 14% (b) 16%

(c) $33\frac{1}{3}\%$ (d) 17%

Sol. (d) Let C.P. be 100



Profit % $\frac{17}{100} \times 100$
= 17%

236. If a person marked a product 25% above the cost price but allows 10% discount then the percentage of profit is.

(a) 12.5% (b) $11\frac{1}{7}\%$

(c) $9\frac{1}{11}\%$ (d) 10%

Sol. (a) % of profit = $25 - 10 - \frac{25 \times 10}{100}$
= 12.5%

Alternative:-

C.P.	M.P.	S.P.
4	5	
	10	9
8	10	9
1 part		

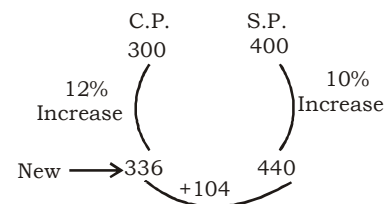
$P \times \frac{1}{8} \times 100 = 12.5\%$

237. A manufacturer fixes his selling price at 33% over the cost of production. If cost of production goes up by 12% and manufacturer raises his selling price by 10% then his percentage profit is.

(a) $28\frac{3}{8}\%$ (b) 35%

(c) $30\frac{5}{8}\%$ (d) 32%

Sol. (c) $33\frac{1}{3}\% = \frac{1 \rightarrow \text{Profit}}{3 \rightarrow \text{C.P}}$



Profit % = $\frac{104}{336} \times 100 = 30\frac{5}{8}\%$

238. A retailer purchased radiosets at the rate of Rs. 400 each from a wholesaler. He raised the price by 30% and then allowed a discount of 8% on each set. His profit will be

(a) 22% (b) 19%

(c) 78.4% (d) 19.6%

Sol. (d) C.P. = Rs. 100

M.R.P. = $\frac{100 \times 130}{100} = 130$

S.P. = $130 \times \frac{92}{100} = 119.6$

Profit = 119.6 - 100 = 19.6

% Profit = $\frac{19.6}{100} \times 100 = 19.6\%$

239. If I would have purchased 11 articles for Rs. 10 and sold all the articles at the rate of 10 for Rs. 11, then find profit percent?

(a) 10% (b) 11%

(c) 21% (d) 100%

Sol. (c) C.P. of one article = Rs. $\frac{10}{11}$

S.P. of one article = Rs. $\frac{11}{10}$

$\therefore$ Profit = $\frac{11}{10} - \frac{10}{11} = \frac{121 - 100}{100}$

= Rs. $\frac{21}{100}$

$\therefore$ Profit % = $\frac{\frac{21}{100} \times 100}{\frac{10}{11}}$

= $\frac{2100}{110} \times \frac{11}{10} = 21\%$

**Alternate:-**

Article	Price
$11_{\times 10}$	$10_{\times 10}$
$10_{\times 11}$	$11_{\times 11}$

After making articles equal

Article	Price
110	100
110	121

$$\text{Requard\%} = \frac{(121-100)}{100} \times 100$$

$$= 21\%$$

240. A person buys some pencils at 5 for a rupee and sells them at 3 for a rupee. His gain percent will be

(a) $66\frac{2}{3}\%$ (b) $76\frac{2}{3}\%$

(c) $56\frac{2}{3}\%$ (d) $46\frac{2}{3}\%$

Sol. (a) Object Rs.

$5_{\times 3}$ 1×3

$3_{\times 5}$ 1×5

(To make equal object)

Object Rs.

15 3

15 5

Profit = 5 - 3 = 2

Profit% = $\frac{2}{3} \times 100 = 66\frac{2}{3}\%$

241. 100 oranges are bought for Rs. 350 and sold at the rate of Rs. 48 per dozen. The percentage of profit or loss is?

(a) 15% loss (b) 15% gain

(c) $14\frac{2}{7}\%$ loss (d) $14\frac{2}{7}\%$ gain

Sol. (d) C.P. of 100 oranges = Rs. 350
S.P. of 12 oranges = Rs. 48

$$\therefore \text{S.P. of 100 oranges} = \frac{48}{12} \times 100$$

$$= \text{Rs. 400}$$

Profit = (400 - 350) = Rs. 50

$$\therefore \text{Profit percent} = \frac{50}{350} \times 100$$

$$= \frac{100}{7} = 14\frac{2}{7}\%$$

242. Oranges are bought at the rate of 10 for Rs. 25 and sold at the rate of 9 for Rs. 25. The profit percent is.

(a) $9\frac{1}{11}\%$ (b) 10%

(c) $11\frac{1}{9}\%$ (d) $12\frac{1}{2}\%$

Sol. (c) Suppose the number of oranges bought = LCM of 10 and 9 = 90

C.P of 90 oranges = $\frac{25}{10} \times 90$

= Rs. 225

S.P. of 90 oranges = $\frac{25}{9} \times 90$

= Rs. 250

Profit % = $\frac{25}{225} \times 100$

$$= \frac{100}{9} = 11\frac{1}{9}\%$$

243. Ramesh bought 10 cycles for Rs. 500 each. He spend Rs. 2000 on the repair of all cycles. He sold five of them for Rs. 750 each. he sold the remaining for Rs. 550 each. Then total gain or loss% is?

(a) $8\frac{1}{3}\%$ gain (b) $8\frac{1}{3}\%$ loss

(c) $7\frac{2}{3}\%$ gain (d) $7\frac{1}{7}\%$ loss

Sol. (d) Total actual C.P. = Rs. (500 × 10 + 2000) = Rs. 7000

Total S.P = Rs. (5 × 750 + 5 × 550)

= Rs. (3750 + 2750)

= Rs. 6500

Loss = Rs. (7000 - 6500)

= Rs 500

Loss percent = $\frac{500}{7000} \times 100$

$$= \frac{50}{7} = 7\frac{1}{7}\%$$

244. A man bought pencils at the rate 6 for Rs. 4 and sold them at rate of 4 for Rs. 6. His gain % in the transaction is?

(a) 75% (b) 80%
(c) 125% (d) 100%

Sol. (c) Let the number of pencils bought

= LCM of 4 and 6 = 12

C.P. of 6 pencils = Rs. 4

$\therefore$ C.P. of 12 pencils = Rs. 8

S.P. of 4 pencils = Rs. 6

S.P. of 12 pencils = Rs. 18

$$\therefore \text{Profit \%} = \frac{10}{8} \times 100 = 125\%$$

245. A fruit seller buys lemons at 2 for a rupee and sells them at 5 for 3 rupees. His profit percent is?

(a) 10% (b) 15%
(c) 20% (d) 25%

Sol. (c) Suppose number of lemons bought

= LCM of 2, 5, 3 = 30

$$\therefore \text{C.P.} = \text{Rs.} \left(\frac{1}{2} \times 30 \right) = \text{Rs. 15}$$

$$\text{S.P.} = \text{Rs.} \left(\frac{3}{5} \times 30 \right) = \text{Rs. 18}$$

$\therefore$ Gain = Rs. 3

$\therefore$ Gain percent

$$= \frac{3}{15} \times 100$$

$$= \frac{1}{5} \times 100$$

= 20%

246. By selling a tape recorder for Rs. 950, I lose 5%. What percent shall i gain by selling it for Rs. 1040 ?

(a) 5 (b) 4
(c) 4.5 (d) 9

Sol. (b) Cost price of tape recorder

$$= \frac{100}{95} \times 950 = 1000 \text{ Rs.}$$

$\therefore$ Gain = 1040 - 1000

= Rs. 40

$$\therefore \text{Gain \%} = \frac{40}{1000} \times 100$$

$$= 4\%$$



247. A shop man bought pens at the rate of 7 for Rs. 10 and sold them at a profit of 40%. How many pens would a customer get for Rs. 10 ?

- (a) 6 (b) 4
(c) 5 (d) 3

Sol. (c) Selling price of seven pens

$$= \frac{10 \times 140}{100} = \frac{140}{10}$$

$$= \text{Rs. } 14$$

$\therefore$ Selling price of one pen

$$= \frac{14}{7} = \text{Rs. } 2$$

Clearly, 5 pens were sold for Rs. 10

248. By selling 12 oranges for Rs. 60, a man loses 25%. The number of oranges he has to sell for Rs. 100, so as to gain 25% is.

- (a) 10 (b) 11
(c) 12 (d) 15

Sol. (c) C.P. of 12 oranges

$$= 60 \times \frac{100}{75} = \text{Rs. } 80$$

For a gain of 25%,
S.P. of 12 oranges

$$= \frac{80 \times 125}{100} = \text{Rs. } 100$$

Hence, 12 oranges has to sell for Rs. 100

[you can also check through options]

249. A man sold 20 apples for Rs. 100 and gained 20%. How many apples did he buy for Rs. 100?

- (a) 20 (b) 22
(c) 24 (d) 25

Sol. (c) If the C.P. of 20 apples be Rs. x, then

$$\frac{x \times 120}{100} = 100$$

$$\Rightarrow x = \frac{100 \times 100}{120} = \text{Rs. } \frac{250}{3}$$

$$\therefore \text{Rs. } \frac{250}{3} = 20 \text{ apples}$$

$$\therefore \text{Rs. } 100 = \frac{20 \times 3 \times 100}{250}$$

$$= 24 \text{ apples}$$

Alternate:-

$$\text{S.P of one Apple} = \frac{100}{20} = 5$$

$$\text{C.P of one Apple} = \frac{5 \times 100}{120} = \frac{25}{6}$$

$$\text{No. of Apples} = \frac{100}{25/6}$$

$$= \frac{100}{25} \times 6 = 24$$

250. A vendor sells lemons at the rate of 5 for Rs. 14, gaining there by 40%. For how much did he buy a dozen lemons?

- (a) Rs. 20 (b) Rs. 21
(c) Rs. 24 (d) Rs. 28

Sol. (c) Cost price of 5 lemons

$$= \frac{100}{140} \times 14$$

$$= \text{Rs. } 10$$

$$\text{C.P of one lemon} = \frac{10}{5} = 2$$

$$\text{Cost price of 12 lemons} = 2 \times 12 = \text{Rs. } 24$$

251. A shop-keeper sold a sewing machine for Rs. 1080 at a loss of 10%. At what price should he has to sell it as to gain 10% on it (in Rs.)?

- (a) 1069 (b) 1200
(c) 1230 (d) 1320

Sol. (d) 10% Loss $\rightarrow 10 \rightarrow 9$

$$10\% \text{ Profit} \rightarrow 10 \rightarrow 11$$

So, $9 \rightarrow 1080$

$$11 \rightarrow \frac{1080}{9} \times 11 = 1320$$

Alternate:-

Cost price of sewing machine

$$= 1080 \times \frac{100}{90}$$

$$= \text{Rs. } 1200$$

$\therefore$ S.P. for a profit of 10%

$$= \frac{1200 \times 110}{100}$$

$$= \text{Rs. } 1320$$

252. By selling on article for Rs. 102, there is a loss of 15% when the article is sold for Rs. 134.40, the net result in the transaction is?

- (a) 12% gain (b) 12% loss
(c) 10% loss (d) 15% gain

Sol. (a) C.P. of article

$$= \frac{100}{100 - \text{loss}\%} \times \text{S.P.}$$

$$= \frac{100}{100 - 15} \times 102 = \text{Rs. } 120$$

On selling at Rs. 134.40

$$\therefore \text{Gain percent} = \frac{14.4}{120} \times 100$$

$$= 12\%$$

253. A fruit vendor buys apples at the rate of 10 for Rs. 100. How many should he sell for Rs. 100, so that he makes profit of 25%?

- (a) 5 (b) 6
(c) 7 (d) 8

Sol. (d) Cost price of each apples

$$= \frac{100}{10} = 10$$

Selling price of each apple

$$= \text{Rs. } \left(10 \times \frac{125}{100} \right) = \text{Rs. } 12.50$$

$\therefore$ Number of apples sold for Rs. 100 are

$$= \frac{100}{12.5} = 8$$

254. Soma blends two varieties of tea, one consisting Rs. 180 per kg and other consisting Rs. 200 per kg in the ratio 5:3. If she sells the blended variety at Rs. 210/kg, then her gain percent is?

- (a) 10% (b) 11%
(c) 12% (d) 13%

Sol. (c)

$$\begin{array}{ccc} 180 & & 200 \\ & \times & \\ 5 & : & 3 \end{array}$$



$$\frac{200-180}{5+3} \Rightarrow \frac{5}{2}$$

$$5 \times \frac{5}{2} : 3 \times \frac{5}{2}$$

$$x = 200 - \frac{25}{2}$$

$$\text{or } 180 + \frac{15}{2}$$

$$\text{C.P. (Mixture)} \Rightarrow \frac{375}{2}$$

$$P \Rightarrow 210 - \frac{375}{2}$$

$$\Rightarrow \frac{45}{2}$$

$$P\% \frac{\frac{45}{2}}{\frac{375}{2}} \times 100 = 12\%$$

Alternate:-

Gain percent

$$= \frac{210 \times (5+3) - (180 \times 5 + 200 \times 3)}{180 \times 5 + 200 \times 3} \times 100$$

$$= \frac{1680 - 1500}{1500} \times 100$$

$$= \frac{180}{1500} \times 100 = 12\%$$

255. A shopkeeper gains 20% while buying the goods and 30% while selling them. Find his total gain percent.

- (a) 50% (b) 36%
(c) 56% (d) 40%

Sol. (c) For two consecutive gains of $x\%$ and $y\%$.

$$\text{Effective gain} = \left(x + y + \frac{xy}{100} \right) \%$$

His total gain percent

$$= \left(20 + 30 + \frac{20 \times 30}{100} \right) = 56\%$$

256. By selling an article for Rs. 69, there is a loss of 8%, when the article is sold for Rs 78, then gain or loss % is?

- (a) neither loss nor gain
(b) 4% gain
(c) 4% loss
(d) 40% gain

Sol. (b) S.P. at 8% Loss = 69
69 $\rightarrow$ 92%

$$78 \rightarrow \frac{92}{69} \times 78 \Rightarrow 104\%$$

So, 4% Gain

Alternate:-

S.P. article = Rs. 69

Loss % = 8%

$$\therefore \text{C.P.} = \text{Rs. } \frac{100 \times 69}{92} = \text{Rs. } 75$$

New S.P. = Rs. 78

$$\therefore \text{Gain \%} = \frac{78 - 75}{75} \times 100 = 4\%$$

257. By selling a plot of land for Rs. 45000 a person loses 10%. At what price he should sell the plot to gain 15%?

- (a) Rs. 50,000 (b) Rs. 55000
(c) Rs. 57500 (d) Rs. 60000

Sol. (c) S.P. at 10% Loss
 $\Rightarrow$ 90% of C.P. $\rightarrow$ 45000
S.P. at 15% Profit
 $\Rightarrow$ 115% of C.P. = ?
90 $\rightarrow$ 45000

$$115 \rightarrow \frac{45000}{90} \times 115 \Rightarrow 57500$$

Alternate:-

$$\text{C.P.} = \frac{100}{100 - \text{loss}\%} \times \text{S.P.}$$

$$= \frac{100}{90} \times 45000 = \text{Rs. } 50,000$$

$\therefore$ S.P. = 115% of Rs. 50,000

$$= \frac{50000 \times 115}{100} = \text{Rs. } 57,500$$

258. A radio dealer sold his radio at a loss of 2.5%. had he sold it for Rs. 100 more, he would have

gained $7\frac{1}{2}\%$. In order to gain

$12\frac{1}{2}\%$, he should sell it for.

- (a) Rs. 1080 (b) Rs. 1125
(c) Rs. 850 (d) Rs. 925

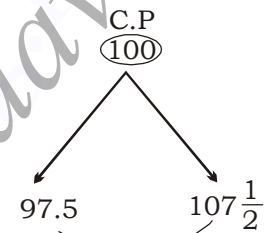
Sol. (b) If C.P. of radio be Rs. x , then
10% of $x = 100 \Rightarrow x = 1000$

for a gain of $12\frac{1}{2}\%$

$$\text{S.P.} = 1000 \times \left(100 + \frac{25}{2} \right) \frac{1}{100}$$

$$= \frac{1000 \times 225}{200} = \text{Rs. } 1125$$

Alternate:-



10 Units = 100

1 Unit = 10

C.P. of radio = 100 Units = 100
 $\times 10 = 1000$

$$\text{S.P. of radio} = \frac{1000 \times 112.5}{100} = 1125$$

259. By selling a basket for Rs. 19.50, a shopkeeper gains 30%. For how much should he sell it to gain 40%?

- (a) Rs. 21 (b) Rs. 21.50
(c) Rs. 24 (d) Rs. 23

Sol. (a) 30% Profit

C.P.	S.P.
100	130
$\downarrow$	$\downarrow$
10	13
13	$\rightarrow$ 19.50

40% gain,

$$14 \rightarrow \frac{19.50}{13} \times 14 = 21$$

Alternate:-

Let C.P. of basket be Rs. x

$\therefore$ 130% of $x = 19.50$

$$\frac{130 \times x}{100} = 19.50 = \text{Rs. } 15$$

For 40% gain,

$$\text{S.P.} = \frac{140 \times 15}{100} = \text{Rs. } 21$$



260. A man bought 20 dozen eggs for Rs. 720. What should be the selling price of each egg if he wants to make a profit of 20%.

- (a) Rs. 3.25 (b) Rs. 3.30
(c) Rs. 3.50 (d) Rs. 3.60

Sol. (d) Cost price of 1 egg

$$= \frac{720}{20 \times 12} = \text{Rs. } 3$$

∴ Required selling price of 1 egg

$$= 3 \times \frac{120}{100} = 3 \times \frac{6}{5} = \text{Rs. } 3.60$$

261. By selling an article for Rs. 700 a man lost 30%. At what price should he have to sold it to gain 30%.

- (a) Rs. 910 (b) Rs. 1200
(c) Rs. 1232 (d) Rs. 1300

Sol. (d) 30% Loss

$$\text{CP} : \text{SP}$$

$$10 : 7$$

$$30\% \text{ Profit} \rightarrow$$

$$\text{CP} : \text{SP}$$

$$10 : 13$$

$$7 \rightarrow 700$$

$$13 \rightarrow 1300$$

Alternate:-

Cost price of article

$$= \frac{100}{100 - \text{loss}\%} \times \text{S.P.}$$

$$= \frac{100}{100 - 30} \times 700$$

$$= \text{Rs. } 1000$$

S.P. for a profit of 30%

$$= 1000 \times \frac{130}{100} = \text{Rs. } 1300.$$

262. By selling 80 ball pens for Rs. 140, Pankaj loses 30%. How many ball pens should he sell for Rs. 104 so as to make a profit of 30%?

- (a) 32 (b) 52
(c) 48 (d) 42

Sol. (a) S.P. at 30% Loss $\rightarrow$

$$\text{C.P.} \quad \text{S.P.}$$

$$10 \rightarrow 7$$

$$\text{S.P.} \Rightarrow \frac{140}{80} = \frac{7}{4}$$

So,

$$\text{S.P. at 30% Profit} \rightarrow 10 \rightarrow 13$$

$$7 \rightarrow \frac{7}{4}$$

$$1 \rightarrow \frac{1}{4}$$

$$\text{S.P.} \Rightarrow 13 \rightarrow \frac{13}{4}$$

No of balls pens $\rightarrow$

$$\frac{104}{\frac{13}{4}} \Rightarrow 32 \text{ balls pens.}$$

Alternate:-

Cost price of 80 ball pens

$$= 140 \times \frac{100}{70} = \text{Rs. } 200$$

For a gain of 30%

$$\text{S.P.} = \frac{200 \times 130}{100} = \text{Rs. } 260$$

$$\therefore \text{Rs. } 260 = 80 \text{ ball pens}$$

$$\therefore \text{Rs. } 104 = \frac{80}{260} \times 104 = 32$$

263. By selling 90 ball pens for Rs. 160 Somi losses 20%. The number of ball pens. Which should be sold for Rs. 96 so as to have profit of 20% is?

- (a) 36 (b) 37
(c) 46 (d) 47

Sol. (a) C.P. S.P.

$$5 \rightarrow 4 \quad \left[\begin{array}{l} \text{at 20\%} \\ \text{Loss} \end{array} \right]$$

$$5 \rightarrow 6 \quad \left[\begin{array}{l} \text{at 20\%} \\ \text{Profit} \end{array} \right]$$

$$4 \rightarrow \frac{160}{90} = \frac{16}{9}$$

$$1 \rightarrow \frac{4}{9}$$

$$6 \text{ Unit} \rightarrow \frac{24}{9}$$

$$\text{No. of ball pens} \Rightarrow \frac{96}{\text{S.P.}} \Rightarrow \frac{96}{\frac{4}{9}}$$

$$\Rightarrow 36$$

Alternate:-

C.P. of 90 ball pens

$$= \frac{100}{80} \times 160 = \text{Rs. } 200$$

S.P. for a gain of 20%

$$= \frac{200 \times 120}{100} = \text{Rs. } 240$$

$$\therefore \text{Rs. } 240 = 90 \text{ ball pens}$$

$$\therefore \text{Rs. } 96 = \frac{90}{240} \times 96 = 36$$

264. Mr. Goutam purchased a flat for Rs. 9,25,000 and spend Rs. 35,000 for its renovation. If he sold the flat for Rs. 10,80,000 then his profit % is?

- (a) 15.0 (b) 17.5
(c) 20.0 (d) 12.5

Sol. (d) Actual cost price of flat

$$= \text{Rs. } (925000 + 35000)$$

$$= \text{Rs. } 960000$$

$$\text{Selling price} = \text{Rs. } 1080000$$

$$\text{Profit} = \text{Rs. } (1080000 - 960000)$$

$$= \text{Rs. } 120000$$

$$\therefore \text{Profit \%} = \frac{120000}{960000} \times 100 = 12.5\%$$

265 By selling an article at $\frac{2}{3}$ of the marked price, there is a loss of 10%. The profit percent when the article is sold at marked price?

- (a) 20% (b) 30%
(c) 35% (d) 40%

Sol. (c) S.P. M.P.

$$2x \quad 3x$$

$$2x \rightarrow 90\% \text{ of C.P.}$$

$$x \rightarrow \frac{90}{2} \% \text{ of C.P.}$$

$$3x \rightarrow \left[\frac{90}{2} \times 3 \right] \% \text{ of C.P.}$$

$$\Rightarrow 135\% \text{ of C.P.}$$

$$\text{So, Profit\%} \Rightarrow 35\%$$



Alternate:-

Suppose marked price = Rs. x

$$\therefore \text{S.P.} = \text{Rs. } \frac{2x}{3}$$

$$\text{C.P.} = \frac{2x}{3 \times 90} \times 100 = \frac{20x}{27}$$

 $\therefore$ Profit percent

$$= \left(\frac{x - \frac{20x}{27}}{\frac{20x}{27}} \right) \times 100$$

$$= \frac{7x}{27} \times \frac{27}{20x} \times 100 = 35\%$$

Alternate:-

$$\text{S.P.} = \text{M.R.P.} \times \frac{2}{3}$$

$$\frac{\text{S.P.}}{2} = \frac{\text{M.R.P.}}{3}$$

Let M.R.P. = 30

S.P. = 20

$$\text{C.P.} = 20 \times \frac{100}{90} = \frac{200}{9}$$

$$\text{Profit} = 30 - \frac{200}{9} = \frac{70}{9}$$

$$\% \text{ Profit} = \frac{70/9 \times 100}{200/9} = 35\%$$

266. Nishant allows a discount of 15% on the marked price. How much above the cost price must he mark his goods as to gain 19%?

- (a) 34% (b) 40%
(c) 25% (d) 30%

Sol. (b) Let the C.P. of the article be Rs. 100.

$$\therefore \text{S.P.} = \text{Rs. } 119$$

If the marked price be Rs. x, then,

$$x = \frac{119 \times 100}{85} = 140.$$

Clearly the marked price is 40% above the cost price.

267. The cost price of an article is Rs. 800. After allowing a discount of 10%, a gain of 12.5% was made. Then the marked price of the article is?

- (a) Rs. 1000 (b) Rs. 1100
(c) Rs. 1200 (d) Rs. 1300

Sol. (a) Let the marked price of article be Rs. x.

$$\therefore \frac{90x}{100} = \frac{800 \times 112.5}{100}$$

$$\Rightarrow \frac{9x}{10} = 900$$

$$x = \frac{900 \times 10}{9}$$

$$x = 100 \times 10 = \text{Rs. } 1000.$$

268. At what percent above the cost must a shop-keeper marks his goods so that he gains 20% even after giving a discount of 10% on the marked price?

- (a) 25% (b) 30%
(c) $33\frac{1}{3}\%$ (d) $37\frac{1}{2}\%$

Sol. (c) Let the C.P. be Rs. 100. Then, S.P. = Rs. 120

Let the marked price be x
Then 90% of x = 120

$$\Rightarrow x = \frac{120 \times 100}{90} = \frac{400}{3}$$

$$= 133\frac{1}{3}\%$$

It means he should mark

$$33\frac{1}{3}\% \text{ higher than C.P.}$$

269. How much percent above the cost price should a shopkeeper mark his goods so as to earn a profit of 32% after allowing discount of 12% on the marked price?

- (a) 50% (b) 40%
(c) 60% (d) 45%

Sol. (a) Let the cost price be Rs. 100 and the marked price be Rs. x

$$\therefore x \times \frac{88}{100} = 132$$

$$\Rightarrow x = \frac{132 \times 100}{88} = 150$$

(i.e. mark it by 50% more.)

270. Seema purchased an article at $\frac{4}{5}$ of its list price and sold it at

20% more than the list price
seema's profit percent was.

- (a) 50% (b) 40%
(c) 30% (d) 25%

Sol. (a) Let list price of article = Rs. 100

$$\therefore \text{C.P. for seema} = 100 \times \frac{4}{5} = \text{Rs. } 80$$

$$\therefore \text{S.P. for seema} = \text{Rs. } 120$$

$$\therefore \text{gain} = 120 - 80 = \text{Rs. } 40$$

$$\therefore \text{Gain percent} = \frac{40}{80} \times 100 = \frac{100}{2} = 50\%$$

271. To gain 8% after allowing a discount 10% by what percent cost price should be hiked in the list price?

- (a) 9% (b) 11%
(c) 18% (d) 20%

Sol. (d) Let the cost price be 100 and marked price be Rs. x

$$\text{Then } \frac{x \times 90}{100} = 108$$

$$\frac{9x}{10} = 108$$

$$x = \frac{108 \times 10}{9} = 120$$

$$\therefore \text{The required percentage} = 20\%$$

272. Joni purchased a wrist watch with 30% discount on the labelled price. He sold it with 40% profit on the price he bought. What was his loss percentage on the labelled price?

- (a) 2% (b) 6%
(c) 4% (d) 8%

Sol. (a) Let marked price = Rs. x

$$\text{C.P.} = \frac{7x}{10}$$



$$\text{S.P.} = \frac{7x}{10} \times \frac{140}{100} = \frac{98x}{100}$$

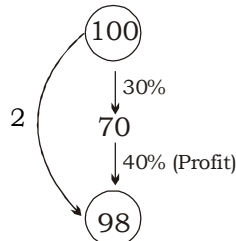
$$\therefore \text{Loss} = x - \frac{98x}{100} = \frac{2x}{100}$$

$$\therefore \text{Loss percent}$$

$$= \frac{2x}{100 \times x} \times 100 = 2\%$$

Alternate:-

M.R.P



$$\text{Loss\%} = \frac{2}{100} \times 100 = 2$$

273. By selling bouquets for Rs. 63 a florist gains 5%. At what price should he sell the bouquets to gain 10% on the cost price?

- (a) Rs. 72.50 (b) Rs. 66
(c) Rs. 69 (d) Rs. 72

Sol. (b) Required selling price

$$= \frac{63}{(100+5)} \times (100+10)$$

$$\Rightarrow \frac{63 \times 110}{105} \Rightarrow \text{Rs. } 66$$

274. A shopkeeper marks the price of an article at Rs. 80. Find the cost price if after allowing a discount of 10% he still gains 20% on the cost price.

- (a) Rs. 60 (b) Rs. 70
(c) Rs. 75 (d) Rs. 53.33

Sol. (a) According to question.

$$\begin{array}{lcl} \text{C.P.} & : & \text{M.R.P} \\ (100-D\%) & : & (100+P\%) \\ (100-10) & : & (100+20) \\ 90 & : & 120 \\ 3 & : & 4 \\ \downarrow \times 20 & & \downarrow \times 20 \\ 60 & & 80 \end{array}$$

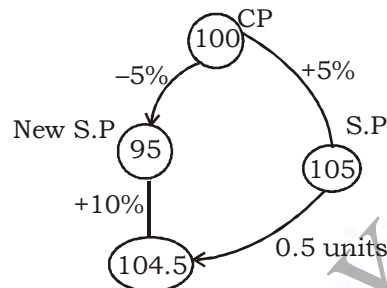
Cost price of the article = Rs. 60

275. A man sells an article at 5% above its cost price. If he had bought it at 5% less than what he paid for it and sold it Rs. 2 less, he would have gained 10%. Find the cost price of the article.

- (a) Rs. 400 (b) Rs. 425
(c) Rs. 360 (d) Rs. 500

Sol. (a) Let the cost price of the article = 100 units

According to the question,



$$0.5 \text{ units} = \text{Rs. } 2$$

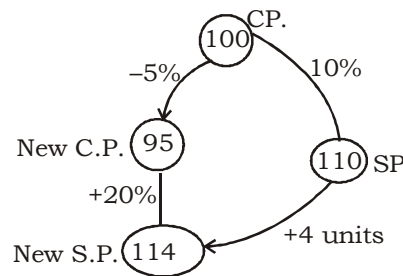
$$100 \text{ units} = \frac{2}{0.5} \times 100 = \text{Rs. } 400$$

276. A briefcase was sold at a profit of 10% if its cost price was 5% less and it was sold for Rs. 7 more the gain would have been 20%. Find the cost price of briefcase.

- (a) Rs. 225 (b) Rs. 200
(c) Rs. 175 (d) Rs. 160

Sol. (c) Let the cost price of the briefcase = 100 units.

According to the question,



$$4 \text{ units} = \text{Rs. } 7$$

$$1 \text{ unit} = \frac{7}{4}$$

$$100 \text{ units} = \frac{7}{4} \times 100 = \text{Rs. } 175$$

Total cost price = Rs. 175

277. A man buys two cycles for a total cost of Rs. 900. By selling one for 4/5 of its cost and other for 5/4 of its cost, he makes a profit of Rs. 90 on the whole transaction. Find the cost price of lower priced cycle.

- (a) Rs. 360 (b) Rs. 250
(c) Rs. 300 (d) Rs. 420

Sol. (c)

I st Cycle		II nd Cycle	
CP	SP	CP	SP
5	4	4	5

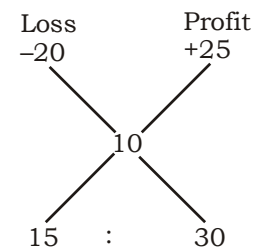
$$\text{Loss \% on Ist cycle} = \frac{1}{5} \times 100 = 20\%$$

$$\text{Profit \% on IInd cycle} = \frac{1}{4} \times 100 = 25\%$$

Total profit on whole transaction

$$= \frac{90}{900} \times 100 = 10\%$$

By allegation rule,



Ratio of cost price $\rightarrow 1 : 2$

According to question,

$$3 \text{ units} = 900$$

$$1 \text{ unit} = 300$$

Cost of lowered price cycle = 1 Unit = Rs. 300

278. A merchant bought two laptops, which together cost him Rs. 480. He sold one of them at a loss of 15% and other at a gain of 19%. If the selling price of both the laptops are equal, find the cost of the lower priced laptop.

- (a) Rs. 280 (b) Rs. 180
(c) Rs. 200 (d) Rs. 300

Sol. (c) Cost price of laptops ($L_1 + L_2$) = Rs. 480

$$-15\% = \frac{-3}{20}, +19\% = \frac{+19}{100}$$

	C.P	S.P
Ist Laptop	20 _{x7}	17 _{x7}
II nd Laptop	100	119 _{x1}



(To make equal S.P)

	C.P	S.P
Ist Laptop	140	119
IInd Laptop	100	119

$$\text{Total C.P} = 140 + 100 = 240$$

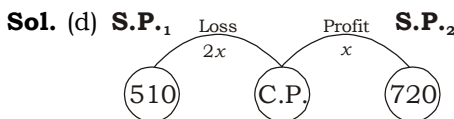
$$240 \text{ Units} = 480$$

$$1 \text{ Unit} = \text{Rs. } 2$$

$$\begin{aligned} \text{Lowered price Laptop} \\ = 100 \times 2 = \text{Rs. } 200 \end{aligned}$$

279. In the land of the famous milkman Joni a milkman sells his buffalo for Rs. 720 at same profit. Had he sold his buffalo at Rs. 510, the quantum of the loss incurred would have been double that of the profit earned what is the cost price.

- (a) Rs. 600 (b) Rs. 625
(c) Rs. 675 (d) Rs. 650



Loss is double of Profit

$$2x + x \Rightarrow 720 - 510$$

$$3x \Rightarrow 210$$

$$x \Rightarrow 70$$

$$\text{C.P.} \Rightarrow 720 - 70 = 650$$

$$\text{or } 510 + 140 \Rightarrow 650$$

Alternate:-

Let the cost price of buffalo

$$= \text{Rs. } x$$

$$\text{Profit} = (720 - x)$$

$$\text{Loss} = (x - 510)$$

According to question,

$$2(720 - x) = (x - 510)$$

$$= 1440 - 2x = x - 510$$

$$3x = 1950$$

$$x = 650$$

$$\text{CP of buffalo} = \text{Rs. } 650$$

Alternate →

Note → In such type of questions follow the given method to save your valuable time.

We will divide the difference of SP. in the ratio of their profit and loss.

$$(720 - 510) = \begin{array}{c} 210 \\ \swarrow \quad \searrow \\ \text{Profit} \quad \text{Loss} \\ 1 \quad : \quad 2 \end{array}$$

$$3 \text{ units} = 210$$

$$1 \text{ unit} = 70$$

$$\text{Cost price} = (720 - 70) = \text{Rs. } 650$$

280. A manufacture estimates that on inspection 12% of the articles he produces will be rejected. He accepts an order to supply 22,000 articles at Rs. 7.50 each. He estimates the profit on his outlay including the manufacturing of rejected articles, to be 20%. Find the cost of manufacturing each article.

- (a) Rs. 6 (b) Rs. 5.50
(c) Rs. 5 (d) Rs. 4.50

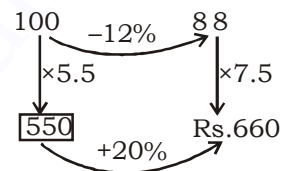
Sol. (b) $\text{S.P.} \rightarrow \frac{88}{100} \times 7.5 \left[\begin{array}{l} \text{at } 20\% \\ \text{Profit} \end{array} \right]$

$$\text{C.P.} \Rightarrow \frac{88 \times 7.5 \times 100}{100 \times 120} \Rightarrow 5.5$$

Alternate:-

Note → In such type of questions assume data according to your need which is easier in calculation,

Let initial quantity = 100



$$\text{Initial cost} = \frac{660}{120} \times 100 = \text{Rs. } 550$$

$$\text{Initial cost per article} = \frac{550}{100}$$

$$= \text{Rs. } 5.50$$

281. The cost of setting up the type of a magazine is Rs. 1000. The cost of running the printing machine is Rs. 120 per 100 copies. The cost of paper, ink and so on is 60 paise per copy. The magazines are sold at Rs. 2.75 each 900 copies are printed, but only 784

copies are sold what is the sum to be obtained from advertisement to give a profit of 10% on the cost ?

- (a) Rs. 730 (b) Rs. 720
(c) Rs. 726 (d) Rs. 736

Sol. (c) Total cost of 900 magazines

$$= 1000 + \frac{120}{100} \times 900 + \frac{60}{100} \times 900$$

$$= 1000 + 1080 + 540 = \text{Rs. } 2620$$

After profit total cost

$$= 2620 + \frac{2620 \times 10}{100} = 2882$$

Selling price of 784 copies

$$= 784 \times 2.75 = \text{Rs. } 2156$$

Required amount from advertisement

$$= 2882 - 2156 = \text{Rs. } 726$$

282. The profit percent of a book seller if he sells book at marked price of tea enjoying a commission of 25% on marked price will be?

- (a) 30% (b) 25%
(c) 20% (d) $33\frac{1}{3}\%$

Sol. (d) If the marked price of ₹ 100 then
c.p = ₹ 75
s.p = ₹ 100

$$\therefore \text{Gain percent} = \frac{25}{75} \times 100$$

$$= \frac{100}{3} = 33\frac{1}{3}\%$$

283. A trader marked the price of a commodity so as to include a profit 25%, but allowed a discount of 16% on the marked price. His actual profit will be?

- (a) 16% (b) 25%
(c) 5% (d) 9%

Sol. (c) C.P of article = 100
Marked price = 125

$$\text{S.P} = \frac{125 \times 84}{100} = ₹ 105$$

$$\text{Gain percent} = 5\%$$

Alternate:-

Gain percent

$$= \left(25 - 16 - \frac{25 \times 16}{100} \right) \% = 5\%$$

$$\boxed{\text{Gain}\% = x - y - \frac{xy}{100}}$$



284. Mohan purchased a bag with 20% discount on the labelled price. He sold it at 40% profit on the price he bought. The % of profit on the labelled price is
- (a) 20% (b) 12%
(c) 18% (d) 24%

Sol. (b) Let the marked price be ₹ 100
Mohan's C.P = ₹ 80

$$\text{Mohan's S.P} = \frac{80 \times 140}{100} = ₹ 112$$

∴ The required profit % = 12%

285. By selling 144 hens Pankaj suffered a loss equal to the selling price of 6 hens. His loss percent is?
- (a) 4% (b) 6%
(c) 9% (d) $4\frac{1}{2}\%$

Sol. (A) Cost price of 144 hens – S.P of 144 hens = SP of 6 hens
∴ SP of 150 hens = CP of 144 hens

$$\Rightarrow \frac{\text{SP}}{\text{CP}} = \frac{144}{150}$$

Let CP of each hen = ₹ 1
CP of 150 hens = ₹ 150
SP of 150 hens = ₹ 144

$$\therefore \text{Loss percent} = \frac{6}{150} \times 100 = 4\%$$

286. By selling 1 dozen ball pens a shopkeeper earned the profit equal to the selling price of 4 ball pens. His profit percent is
- (a) 50% (b) 40%
(c) $33\frac{1}{3}\%$ (d) $31\frac{1}{4}\%$

Sol. (a) SP of 12 ball pens = CP of 12 ball pens + SP of 4 ball pens
⇒ SP of 8 ball pens = CP of 12 ball pens

$$\frac{\text{S.P.}}{\text{C.P.}} = \frac{12}{8}$$

$$\therefore \text{Gain percent} = \frac{4}{8} \times 100 = 50\%$$

287. The loss incurred on selling 21 articles equals the selling price of 3 articles. Then the loss % is

- (a) $9\frac{1}{11}\%$ (b) 10%
(c) $12\frac{1}{2}\%$ (d) $11\frac{1}{9}\%$

Sol. (c) S.P of 3 articles = C.P of 21 articles – SP of 21 articles
S.P of 24 articles = C.P of 21 articles

$$\Rightarrow \frac{\text{SP}}{\text{CP}} = \frac{21}{24}$$

$$\therefore \text{Loss percent} = \frac{24-21}{24} \times 100 = \frac{3}{24} \times 100 = 12\frac{1}{2}\%$$

288. A man sold 250 Chairs and had a gain equal to the selling price of 50 Chairs. His profit % is.

- (a) 20% (b) 25%
(c) 50% (d) 15%

Sol. (b) S.P of 250 Chairs – C.P of 250 Chairs = S.P. of 50 Chairs
⇒ S.P of 200 Chairs = C.P. of 250 Chairs

$$\Rightarrow \frac{\text{SP}}{\text{CP}} = \frac{250}{200}$$

$$\therefore \text{Profit \%} = \frac{250-200}{200} \times 100$$

$$= \frac{50}{200} \times 100 = 25\%$$

289. A vendor loses the selling price of 4 Oranges on selling 36 oranges. His loss % is?

- (a) $12\frac{1}{2}\%$ (b) 9%
(c) 10% (d) $11\frac{1}{2}\%$

Sol. (c) S.P of 36 oranges = C.P of 36 oranges – S.P of 4 oranges

$$\Rightarrow \text{S.P of 40 oranges} = \text{C.P of 36 oranges}$$

$$\text{Loss percent} = \frac{4}{40} \times 100$$

$$= \frac{1}{10} \times 100 = 10\%$$

290. If an article is sold for ₹ 178 at a loss of 11%, what should be its selling price in order to earn a profit of 11%

- (a) ₹ 222.50 (b) ₹ 267
(c) ₹ 222 (d) ₹ 220

Sol. (c) The article is sold at 11% loss
∴ 89% of CP = ₹ 178

$$\Rightarrow \text{CP} = ₹ \frac{178 \times 100}{89} = ₹ 200$$

To gain 11%

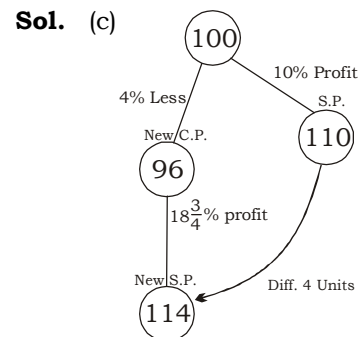
$$\text{S.P} = 111\% \text{ of } ₹ 200$$

$$= ₹ \frac{111}{100} \times 200 = ₹ 222$$

291. A bookseller sells a book at a profit of 10%. If he had bought it at 4% less and sold it for ₹ 6 more, he would have gained

$$18\frac{3}{4}\% \text{ Then cost price is?}$$

- (a) ₹ 130 (b) ₹ 140
(c) ₹ 150 (d) ₹ 160



$$4 \text{ Unit} \rightarrow 6$$

$$100 \text{ Unit} \rightarrow 25 \times 6 = 150$$

Alternate:-

Let the CP of the book be ₹ x

$$\text{Initial SP} = \frac{110}{100} \times x = 1.1x$$

$$\text{New SP} = 0.96x$$



$$\text{New SP} = \left(100 + \frac{75}{4}\right)\% \text{ of } 0.90x$$

$$\Rightarrow \frac{475}{100} \times 0.96x = 1.14x$$

Therefore

$$1.14x - 1.1x = 6$$

$$0.04 = 6$$

$$x = \frac{6}{0.04} = \frac{600}{4} = ₹ 150$$

292. On selling an almirah for ₹ 2576, Rahul got a profit of 12%. Had it been bought for ₹ 100 less, the profit % would have been.

(a) $11\frac{1}{9}\%$ (b) $13\frac{1}{3}\%$

(c) $17\frac{1}{11}\%$ (d) $17\frac{9}{11}\%$

Sol. (c) Cost price of the article

$$= \left(\frac{100}{112} \times 2576\right) = 2300$$

$$\text{New CP} = 2200$$

$$\therefore \text{Gain percent}$$

$$= \frac{2576 - 2200}{2200} \times 100$$

$$= 17\frac{1}{11}\%$$

293. By selling 4 articles for ₹ 1, June loses 4%. Had he sold three articles for ₹ 1, the profit would have been?

(a) 36% (b) 28%
(c) 16% (d) 12%

Sol. (B) C.P of 1 article = $\frac{1}{4} \times \frac{100}{96}$

$$= ₹ \frac{25}{96}$$

$$\therefore \text{CP of 3 articles} = \frac{75}{96}$$

$$\text{Gain} = 1 - \frac{75}{96}$$

$$= \frac{96 - 75}{96} = \frac{21}{96} = \frac{7}{32}$$

$$\text{Gain\%} = \frac{7}{32} \times \frac{75}{96} \times 100 = 28\%$$

294. By selling 12 kg of Potatoes for ₹ 63, a shopkeeper gains 5%. What does he gain or lose percent by selling 50 kg of the same Potatoes for ₹ 247.50?

- (a) 1% loss
(b) No profit, no loss
(c) 2.5% loss
(d) 1% profit

Sol. (A) C.P of 12 kg Potatoes

$$= ₹ \left(\frac{63 \times 100}{105}\right) = ₹ 60$$

$$\therefore \text{CP of 50 kg Potatoes}$$

$$= \frac{60}{12} \times 50 = 250$$

$$\text{Loss} = ₹ (250 - 247.50) = ₹ 2.5$$

$$\therefore \text{Loss \%} = \frac{2.5}{250} \times 100 = 1\%$$

295. 'A' sold a tape recorder to 'B' ₹ 4860 at a loss of 19%. Again 'B' sold it to C at a price that would give 'A' a profit of 17%. Then gain % of B is

- (a) $22\frac{2}{9}\%$ (b) $33\frac{1}{3}\%$
(c) $44\frac{4}{9}\%$ (d) $66\frac{2}{3}\%$

Sol. (c)

$$\begin{array}{ccccc} \text{A} & : & \text{B} & : & \text{C} \\ 100 & : & 81 & : & 117 \end{array}$$

$$\text{Profit of B} \Rightarrow 117 - 81 \Rightarrow 36$$

$$\left[\frac{\text{Profit\%}}{\text{for B}}\right] = \frac{36}{81} \times 100$$

$$\Rightarrow 44\frac{4}{9}\%$$

Alternate:-

C.P of tape recorder for A

$$= \frac{4860 \times 100}{(100 - 19)} = ₹ 6000$$

$$\therefore \text{S.P for B} = \frac{6000 \times 117}{100}$$

$$= ₹ 7020$$

$$\therefore \text{B's gain} = 7020 - 4860 = ₹ 2160$$

$$\therefore \text{Required profit \%} = \frac{2160}{4860} \times 100$$

$$= 44\frac{4}{9}\%$$

296. Vivin sells two tape recorders at the same price. On one he gain 10% and on the other he loses 10%. The total gain or loss in the transaction is

- (a) 1% gain
(b) 1% loss
(c) No loss no gain
(d) 2% loss

Sol. (b) Note: When S.P of each two items is same on one of them there is x% loss and on the other there is x% gain, then there is always a loss given by $(x\% \text{ of } x)\%$

$$= \frac{x^2}{100}$$

$$\therefore \text{The required loss \%}$$

$$= \frac{10 \times 10}{100} = \frac{100}{100} = 1\% \text{ Loss}$$

297. A dealer sold two types of good for ₹ 10,000 each. One on of them he lost 20% and on the other he gained 20%. His gain or loss % is?

- (a) 2% loss (b) 2% gain
(c) 4% gain (d) 4% loss

Sol. (d) Here S.P. is same

$$\therefore \text{There is always a loss}$$

$$\text{Loss percent} = \frac{20 \times 20}{100} = 4\%$$

298. Two bicycles were sold for ₹ 3990 each gaining 5% on one and losing 5% on other. The gain or loss percent in the whole transaction is?

- (a) Neither gain nor loss
(b) 2.5% gain
(c) 2.5% loss
(d) 0.25% loss



Sol. (d) In such a situation there is always a loss

The selling price is immaterial

Loss %

$$= \left(\frac{\text{Common loss or gain}}{10} \right)^2$$

$$= \left(\frac{5}{10} \right)^2 = \frac{25}{100} = 0.25\%$$

299. When the price of cloth was reduced by 25% quantity of cloth increased by 20%. What was the effect on gross receipt of the shop?

- (a) 5% increase
(b) 5% decrease
(c) 10% increase
(d) 10% decrease

Sol. (d) Price 4 3 [25% ↓]
 × ×

Quantity $\frac{5}{20}$ $\frac{6}{18}$ [20% ↑]

$$= \frac{2}{20} \times 100 = 10\% \text{ decrease}$$

Alternate:-

Required percent effect

$$= \left(20 - 25 - \frac{20 \times 25}{100} \right) \%$$

$$= (20 - 25 - 5\%)$$

$$= -10\% \text{ (10\% decrease)}$$

Negative sign shows decrease.

300. A cloth merchant sold half of his cloth at 20% profit, half of the remaining at 20% loss and the rest was sold at his cost price. In the total transaction, his gain or loss will be.

- (a) 5% profit
(b) Neither loss nor gain
(c) 5% loss
(d) 10% profit

Sol. (a) Let C.P. = 100

S.P. →

$$\Rightarrow \frac{1}{2} \times 120 = 60 \quad [20\% \text{ Profit}]$$

$$\Rightarrow \frac{1}{4} \times 80 = 20 \quad [20\% \text{ Loss}]$$

$$\frac{1}{4} \times 100 = 25 \quad [\text{at C.P.}]$$

$$\text{Total S.P.} \Rightarrow 60 + 20 + 25 = 105$$

$$\text{P\%} \Rightarrow 5\%$$

Alternate:-

$$\text{Total C.P.} = ₹ 100$$

$$\text{Total S.P.}$$

$$= ₹ \left(\frac{50 \times 120}{100} + \frac{25 \times 80}{100} + 25 \right)$$

$$= ₹ (60 + 20 + 25) = 105$$

$$\therefore 5\% \text{ gain}$$

$$\left[\frac{105 - 100}{100} \times 100 \right]$$

301. A man sold two articles at ₹ 375 each on article he gets 25% profit and on the other he loses 25%. The gain or loss % on the whole transaction is:

$$(a) 6\% \text{ loss} \quad (b) 4\frac{1}{6}\% \text{ gain}$$

$$(c) 5\% \text{ gain} \quad (d) 6\frac{1}{4}\% \text{ loss}$$

Sol. (d) Here both articles are sold at the same price.

Hence there is always loss

$$\therefore \text{Loss percent} = \frac{25 \times 25}{100}$$

$$= \frac{25}{4} = 6\frac{1}{4}\%$$

302. A cloth merchant sold half of his cloth at 40% profit, half of the remaining at 40% loss and the rest was sold at the cost price. In the total transaction his gain or loss will be

- (a) 20% gain (b) 25% loss
(c) 10% gain (d) 15% loss

Sol. (c) Let the merchant bought 100 metres of cloth for ₹ 100

$$\therefore \text{Total S.P.}$$

$$= ₹ \left(\frac{50 \times 140}{100} + \frac{25 \times 60}{100} + 25 \right)$$

$$= ₹ (70 + 15 + 25) = ₹ 110$$

$$\therefore \text{Gain percent} = 10\%$$

303. Some toffees were bought at the rate of 11 for ₹ 10 and the same number at the rate of 9 for ₹ 10. If the whole Toffees was sold at one rupee per toffees, then the gain or loss in whole transactions

- (a) 1% loss
(b) 1% gain
(c) no loss, no gain
(d) 1.5 gain

Sol. (A) Let the number of toffees of each type bought be 99 (LCM of 9, 11)

$$\text{C.P. of first kind of 99 toffees} = ₹ 90$$

$$\text{C.P. of second kind of 99 toffees} = ₹ 110$$

$$\therefore \text{CP of 198 toffees} = ₹ 200$$

$$\therefore \text{SP of 198 toffees} = ₹ 198$$

$$\text{Loss \%} = \frac{2}{200} \times 100 = 1\%$$

304. A fruit seller buys some oranges at the rate of 4 for ₹ 10 and an equal number at 5 for ₹ 10. He sells the whole lot at 9 for ₹ 20. Find his loss or gain?

$$(a) 1\frac{19}{81}\% \text{ loss} \quad (b) 1\frac{19}{81}\% \text{ gain}$$

- (c) No loss no profit
(d) 2% loss

Sol. (a) Let the oranges

$$\Rightarrow 180 \text{ [LCM of 4, 5, 9]}$$

$$\text{So, C.P.} \Rightarrow \frac{10}{4} \times 180 + \frac{10}{5} \times 180$$

$$\Rightarrow 450 + 360 = 810$$

$$\text{S.P.} \Rightarrow \frac{20}{9} \times 2 \times 180 \Rightarrow 800$$

$$\text{Loss\%} \Rightarrow \frac{810 - 800}{810} \times 100$$

$$\Rightarrow \frac{100}{81} \Rightarrow 1\frac{19}{81}\%$$

Alternate:-

Let 20 oranges of each type be bought



C.P. of an orange of Ist type

$$= ₹ \frac{10}{4}$$

C.P. of an orange of IInd type

$$= ₹ \frac{10}{5}$$

C.P. of 40 oranges

$$= ₹ \left(20 \times \frac{10}{4} + 20 \times \frac{10}{5} \right) = ₹ 90$$

$$\begin{aligned} \text{SP of 40 oranges} &= 40 \times \frac{20}{9} \\ &= \frac{800}{9} \end{aligned}$$

$$\text{Loss percent} = \frac{90 - \frac{800}{9}}{90} \times 100$$

$$= \frac{100}{81} = 1\frac{19}{81}\%$$

305. A man buys a toy for 25 and sell it for 30. His gain percent is

- (a) 20% (b) 5%
(c) 10% (d) 2.5%

Sol. (a) Profit percent

$$= \frac{30 - 25}{25} \times 100 = \frac{5}{25} \times 100$$

$$= \frac{500}{25} = 20\%$$

306. If a man estimates his loss as 20% of the selling price, then actual loss percent is:

- (a) 20% (b) 25%

- (c) $\frac{40}{3}\%$ (d) $\frac{50}{3}\%$

Sol. (d) Let the C.P. be = ₹ 100

$$\therefore \text{C.P.} - \text{S.P.} = \frac{1}{5} \text{S.P.}$$

$$\Rightarrow 100 = \left(1 + \frac{1}{5}\right) \text{S.P.}$$

$$\Rightarrow \text{S.P.} = \frac{100 \times 5}{6} = \frac{250}{3}$$

$$\therefore \text{Loss \%} = \frac{100 - \frac{250}{3}}{100} \times 100$$

$$= \frac{50}{3}\%$$

Alternate:-

$$-20\% = \frac{1}{5} \rightarrow \text{Loss}$$

$$\text{C.P.} = \text{S.P.} + \text{Loss} = 5 + 1 = 6$$

$$\text{Loss\%} = \frac{1}{6} \times 100 = 16\frac{2}{3}\%$$

$$= \frac{50}{3}\%$$

307. If 3 toys are sold at the cost price of 4 toys of the same kind, the profit will be

- (a) 25% (b) $33\frac{1}{3}\%$
(c) $66\frac{2}{3}\%$ (d) 50%

Sol. (b) Let the cost price of each toy be 'x'

$$\therefore \text{Cost price of 4 toys} = \text{SP of 3 toys} = 4x$$

$$\therefore \text{SP of 4 toys} = \frac{4}{3} \times 4x = \frac{16}{3}x$$

$$\% \text{ profit} = \frac{\frac{16}{3}x - 4x}{4x} \times 100$$

$$= \frac{100}{3}\% = 33\frac{1}{3}\%$$

Alternate:-

$$3 \text{ S.P.} = 4 \text{ C.P.}$$

$$\frac{\text{S.P.}}{4} = \frac{\text{C.P.}}{3}$$

$$\text{Profit\%} = \frac{1}{3} \times 100 = 33\frac{1}{3}\%$$

308. If selling price of article is $\frac{8}{5}$ times of its C.P, the profit percent on it is:

- (a) 120% (b) 16%
(c) 40% (d) 60%

Sol. (d) Let the C.P. be 'x'

$$\therefore \text{S.P.} = \frac{8}{5}x$$

$$\therefore \text{Gain} = \frac{8x - 5x}{5} = \frac{3x}{5}$$

$$\text{Now Gain \%} = \frac{\frac{3x}{5}}{x} \times 100$$

$$= \frac{3}{5} \times 100 = 60\%$$

Alternate:-

$$\text{S.P.} = \text{C.P.} \times \frac{8}{5}$$

$$\frac{\text{S.P.}}{8} : \frac{\text{C.P.}}{5}$$

$$\text{Profit\%} = \frac{3}{5} \times 100 = 60\%$$

309. A merchant fixes the sale price of his goods at 15% above the cost price. He sells his good at 12% less than the fixed price. His profit % is:

- (a) 2.5% (b) $1\frac{1}{5}\%$
(c) 1.5% (d) 2%

Sol. (b) let C.P. = 100

$$\text{So, MRP} = 115 \left[\begin{array}{l} \therefore 15\% \\ \text{above C.P.} \end{array} \right]$$

$$\text{S.P.} \Rightarrow 115 \times \frac{88}{100} \Rightarrow 101.2$$

$$\text{Profit} \Rightarrow 101.2 - 100 \Rightarrow 1.2$$

$$\text{Profit\%} \Rightarrow 1.2\%$$

Alternate:-

Let the C.P. be ₹ 100

$$\therefore \text{Marked price} = ₹ (100 + 15\% \text{ of } 100) = ₹ 115$$

The good are sold at the discount of 12%

$$\therefore \text{SP} = (115 - 12\% \text{ of } 115) = ₹ 101.20$$

$$\text{Profit} = (101.20 - 100) = ₹ 1.20$$

$$\therefore \text{Profit \%} = \frac{1.20}{100} \times 100 = 1.2\%$$

$$= 1\frac{2}{10} = 1\frac{1}{5}\%$$



310. Josepn's salary is reduced by 10%. In order to have his salary back to his normal (original) amount, it must be raised by

(a) 12.5% (b) $11\frac{1}{9}\%$

(c) 10% (d) 11%

Sol. (b) Required percent increase

$$= \frac{10}{90} \times 100 = \frac{100}{9} = 11\frac{1}{9}\%$$

Alternate:-

$$10\% = \frac{-1}{10}$$

Original Salary = 10

New Salary = 9

$$\% \text{ Increase} = \frac{1}{9} \times 100 = 11\frac{1}{9}\%$$

311. Raghavan purchased a scooter at $\frac{13}{15}$ of it marked price and sold it 12% more than its marked price. His gain is
- (a) 20% (b) 30%

(c) $3\frac{1}{13}\%$ (d) $29\frac{3}{13}\%$

Sol. (d) C.P. $\Rightarrow \frac{13}{15}$ M.P.

C.P.	M.P.
13	15
↓	↓
130	150

(12% more)

S.P.

$$150 + 18 = 168$$

$$\text{So, gain\%} = \frac{168 - 130}{130} \times 100$$

$$= 29\frac{3}{13}\%$$

Alternate:-

Let the marked price be x

$$\therefore \text{C.P.} = \frac{13}{15}x$$

$$\text{S.P.} = \frac{112x}{100}$$

$$\therefore \text{Profit} = \left(\frac{112x}{100} - \frac{13x}{15} \right)$$

$$= \left(\frac{336 - 260x}{300} \right) = \frac{76x}{300}$$

$$\therefore \text{Profit \%} = \frac{76x}{300} \times \frac{15}{13x} \times 100$$

$$= 29\frac{3}{13}\%$$

Alternate:-

$$\text{C.P.} = \text{S.P.} \times \frac{13}{15}$$

$$\frac{\text{C.P.}}{13} : \frac{\text{S.P.}}{15}$$

$$\text{Profit} = \frac{15 \times 12}{100} = 1.8$$

$$\text{New S.P.} = 15 + 1.8 = 16.8$$

$$\text{Profit} = 16.8 - 13 = 3.8$$

$$\text{Profit\%} = \frac{3.8 \times 100}{13} = 29\frac{3}{13}\%$$

312. By selling 100 pencils, a shopkeeper gains the selling price of 20 pencils. His gain percent is

(a) 25% (b) 20%

(c) 15% (d) 12%

Sol. (a) By selling 100 pencils, shopkeeper gains the S.P of 20 pencils
Clearly, CP of 100 pencils = SP of 80 pencils

Let CP of each pencil = 1

CP of 80 pencils = 80

SP of 80 pencils = 100

$$\therefore \text{Gain percent} = \frac{20}{80} \times 100$$

$$= 25\%$$

Alternate:-

$$100 \text{ S.P.} - 100 \text{ C.P.} = 20 \text{ S.P.}$$

$$80 \text{ S.P.} = 100 \text{ C.P.}$$

$$\frac{\text{S.P.}}{5} : \frac{\text{C.P.}}{4}$$

$$\% \text{ Profit} = \frac{1}{4} \times 100 = 25\%$$

313. A merchant find his profit as 20% of the selling. His actual profit percent is

(a) 20% (b) 22%

(c) 25% (d) 30%

Sol. (c) Let the CP of the article be x and SP be y.

According to the question,

$$y - x = \frac{20y}{100}$$

$$\Rightarrow y - \frac{y}{5} = x \Rightarrow 4y = 5x$$

$$\text{Actual profit \%} = \frac{y - x}{x} \times 100$$

$$= \frac{4y - 4x}{4x} \times 100 = 25\%$$

$$\Rightarrow \frac{5x - 4x}{4x} \times 100 \Rightarrow 25\%$$

Alternate:-

$$+20\% = \frac{1}{5} \rightarrow$$

$$\text{C.P.} = 5 - 1 = 4$$

$$\text{Accual profit\%} = \frac{1}{4} \times 100 = 25\%$$

314. By selling an article for ₹ 450, I lose 20%. For what price should I sell it to gain 20%?

(a) ₹ 490 (b) ₹ 675

(c) ₹ 470 (d) ₹ 562.50

Sol. (b) C.P of article

$$= \frac{100}{100 - 20} \times 450$$

$$\text{C.P.} = \frac{100 \times 450}{80} = ₹ 562.50$$

$\therefore$ To gain 20%

$$\text{New S.P.} = \frac{562.5 \times 120}{100} = ₹ 675$$

315. There is a profit of 20% on the cost price of article. The % of profit, when calculated on selling price is.

(a) $16\frac{2}{3}\%$ (b) $15\frac{1}{3}\%$

(c) $14\frac{1}{3}\%$ (d) $17\frac{1}{3}\%$



Sol. (a) C.P of article = ₹ x

$$\text{S.P} = \frac{120x}{100} = ₹ \frac{6x}{5}$$

$$\text{Gain} = \frac{6x}{5} - x = ₹ \frac{x}{5}$$

$$\therefore \text{Gain percentage} = \frac{\text{Gain}}{\text{S.P}} \times 100$$

$$= \frac{\frac{x}{5}}{\frac{6x}{5}} \times 100 = \frac{50}{3} = 16\frac{2}{3}\%$$

Alternate:-

$$+20\% = \frac{1}{5} \rightarrow \text{Profit}$$

$$\frac{1}{5} \rightarrow \text{C.P}$$

$$\text{S.P} = 5 + 1 = 6 \text{ Unit}$$

$$\text{Profit\% of S.P} = \frac{1}{6} \times 100 = 16\frac{2}{3}\%$$

316. The cost price of a radio is ₹ 600. The 5% of the cost price is charges towards transportation. After adding that, if the net profit to be made is 15% then the selling price of radio must be

- (a) 725.10 (b) 724.50
(c) 700 (d) 730.50

Sol. (b) Actual C.P. of radio = 600

$$+ \frac{600 \times 5}{100} = ₹ 630$$

$$\therefore \text{Required S.P.} = \frac{630 \times 115}{100} = ₹ 724.50$$

317. If bananas are bought at the rate of 4 for a rupee, how many must be sold for a rupee so as to gain

$$33\frac{1}{3}\%$$

- (a) 0 (b) 1
(c) 3 (d) 2

Sol. (c) S.P. of 4 Bananas

$$= \left(100 + \frac{100}{3}\right)\% \text{ of ₹ 1}$$

$$= ₹ \frac{400}{300} = ₹ \frac{4}{3}$$

$\therefore$ Number of bananas sold for

$$₹ \frac{4}{3} = 4$$

$\therefore$ Number of bananas sold for ₹ 1

$$= \frac{4}{4} \times 3 = 3$$

318. A merchant purchases a wrist watch for ₹ 450 and fixes its list price in such a way that after allowing a discount of 10% he earns a profit of 20%. Then the list price of watch is.

- (a) ₹ 400 (b) ₹ 300
(c) ₹ 500 (d) ₹ 600

Sol. (d) If the marked price of watch be 'x' then

$$x \times \frac{90}{100} = \frac{450 \times 120}{100}$$

$$\Rightarrow x = \frac{450 \times 120}{90}$$

$$= ₹ 600$$

319. There is 10% loss if an article is sold at ₹ 270. Then the cost price of the article is.

- (a) ₹ 300 (b) ₹ 270
(c) ₹ 320 (d) ₹ 250

Sol. (a) C.P. of article = ₹ x (let.)
According to the question

$$\Rightarrow x = \frac{270 \times 100}{90}$$

$$= ₹ 300.$$

320. If a shirt costs ₹ 64 after 20% discount is allowed, what was its original price is ₹ ?

- (a) 76.80 (b) 80
(c) 88 (d) 86.80

Sol. (b) If the original price of shirt be 'x', Then

$$x \times \frac{80}{100} = 64 \Rightarrow x = \frac{64 \times 100}{80}$$

$$x = ₹ 80$$

321. If the selling price of an article is

$$\frac{1}{3} \text{ of cost price, find gain\%}$$

- (a) 25% (b) $33\frac{1}{3}\%$

- (c) 1.33% (d) $66\frac{2}{3}\%$

Sol. (b) C.P. of article = ₹ x (let)

$$\text{S.P. of article} = ₹ \frac{4x}{3}$$

$$\text{Gain} = \frac{4x}{3} - x = ₹ \frac{x}{3}$$

$$\therefore \text{Gain Percent} = \frac{\frac{x}{3}}{x} \times 100$$

$$= \frac{100}{3} = 33\frac{1}{3}\%$$

Alternate:-

$$\text{Let CP} = 3x$$

$$\text{SP} = 4x$$

$$\text{Profit\%} = \frac{x}{3x} \times 100$$

$$= 33\frac{1}{3}\%$$

322. The total cost of 8 buckets and 5 mugs is ₹ 92 and the total cost of 8 mugs and 5 buckets is ₹ 77. Find the cost of 2 mugs and 3 buckets.

- (a) ₹ 35 (b) ₹ 70
(c) ₹ 30 (d) ₹ 38

Sol. (a) C.P. of 1 bucket = x

$$\text{C.P. of 1 mug} = y$$

$$\therefore 8x + 5y = 92 \quad \dots(i)$$

$$5x + 8y = 77 \quad \dots(ii)$$

By using equation (i) $\times 5$ - equation (ii) $\times 8$

$$40x + 25y - 40x - 64y = 460 - 616$$

$$\Rightarrow -39y = -156 \Rightarrow y = 4$$

put the value of y in equation (i)

$$\text{From equation (i)} \rightarrow 8x + 20 = 92$$

$$\Rightarrow x = 9$$

$$\therefore \text{C.P of 2 mugs and 3 buckets}$$

$$= 2 \times 4 + 3 \times 9 = ₹ 35$$

323. If books bought at prices from ₹ 150 to ₹ 300 are sold at prices ranging from ₹ 250 to ₹ 350. What is the greatest possible profit that might be made in selling 15 books.

- (a) cannot be determined
(b) ₹ 750
(c) ₹ 4250
(d) ₹ 3000



Sol. (d) Minimum cost price

$$= 150 \times 15 = 2250$$

Maximum selling price

$$= 350 \times 15 = 5250$$

$$\text{Gain} = 5250 - 2250 = ₹ 3000$$

[150 being the lowest and 350 being the heighest price.]

324. A merchant loses 10% by selling an article. If the cost price of the article is ₹ 15, then the selling price of the article is ₹

(a) 13.20 (b) 16.50

(c) 12.30 (d) 13.50

Sol. (d) S.P of an article

$$= \frac{(100 - \text{loss}\%)}{100} \times \text{C.P.}$$

$$= \frac{(100 - 10)}{100} \times 15$$

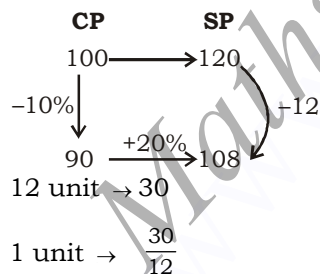
$$= \frac{90 \times 15}{100} = ₹ 13.50.$$

325. Pooja wants to sell a watch at profit of 20%. She bought it at 10% less and sold it at ₹ 30 less, but still she gained 20%. The cost price of watch is ₹

(a) 240 (b) 220

(c) 250 (d) 225

Sol. (c) Let CP = 100



$$\text{CP (100 units)} = \frac{30}{12} \times 100 = \text{Rs. } 250$$

326. An item when sold for ₹ 1690 earned 30% profit on the cost price, Then the cost price is ₹

(a) 507 (b) 630

(c) 1300 (d) 130

Sol. (c) If the C.P be x, then

$$\frac{x \times 130}{100} = 1690$$

$$x = \frac{1690 \times 100}{130}$$

$$x = ₹ 1300$$

327. A fan is listed at ₹ 150 and a discount of 20% is given. Then the selling price is—

(a) ₹ 180 (b) ₹ 150

(c) ₹ 120 (d) ₹ 110

Sol. (c) S.P of the fan = $\frac{150 \times 80}{100}$
= Rs. 120.

328. While selling a retailer a company allows 30% discount on the marked price of their products. If the retailer sells those goods at marked price, his profit will be

(a) 30% (b) $42\frac{1}{7}\%$

(c) 40% (d) $42\frac{6}{7}\%$

Sol. (d) If the marked price of the product be ₹ 100, then

$$\text{C.P of retailer} = 100 - 30 = ₹ 70$$

$$\text{S.P retailer} = 100$$

$$\therefore \text{Gain percent} = \frac{30}{70} \times 100$$

$$= 42\frac{6}{7}\%$$

329. On selling an article for ₹ 651, there is a loss of 7%. The cost price of that article is ₹

(a) 744 (b) 751

(c) 793 (d) 700

Sol. (d) Let the C.P of article be 'x'

$$\therefore (100 - 7)\% x = 651$$

$$x = \frac{651}{93} \times 100$$

$$x = ₹ 700$$

330. Nishant buys an article for ₹ 27 and sells it at a profit of 10% of the selling price. The selling price of article is ₹

(a) 29.70 (b) 30

(c) 37 (d) 32

$$\text{Sol. (b) S.P.} - \text{C.P.} = \frac{10\% \times \text{S.P.}}{100}$$

$$= \frac{\text{S.P.}}{10} \Rightarrow \text{S.P.} - \frac{\text{S.P.}}{10} = \text{C.P.} = 27$$

$$\frac{10\text{S.P.} - \text{S.P.}}{10} \Rightarrow \frac{9\text{S.P.}}{10} = 27$$

$$\Rightarrow \text{S.P.} = \frac{27 \times 10}{9}$$

$$\text{S.P.} = ₹ 30$$

Alternate:-

$$10\% = \frac{1}{10} \rightarrow \text{Profit}$$

$$\text{CP} = 10 - 1 = 9$$

$$9 \text{ units} \rightarrow \text{Rs. } 27$$

$$1 \text{ units} \rightarrow \text{Rs. } 3$$

$$\text{SP (10 units)} = 3 \times 10 = \text{Rs. } 30$$

331. A milkman bought 70 litres of milk for ₹ 630 and added 5 litres of water. If he sells it at ₹ 9.00 per litre, his profit percentage is

(a) $8\frac{1}{5}\%$ (b) 7%

(c) $8\frac{2}{5}\%$ (d) $7\frac{1}{7}\%$

Sol. (d) C.P. of 75 litres of mixture of milk and water = ₹ 630

S.P. of 75 litres of mixture of milk

$$\text{and water} = 9 \times 75 = ₹ 675$$

$$\text{Gain} = 675 - 630 = ₹ 45$$

$$\text{Gain percent} = \frac{45}{630} \times 100$$

$$= \frac{50}{7} = 7\frac{1}{7}\%$$

332. In terms of percentage profit, which is best transaction?

C.P (in ₹) **Profit (in ₹)**

(I) 36 17

(II) 50 24

(III) 40 19

(IV) 60 29

(a) I (b) II

(c) III (d) IV

Sol. (d) Case I : Percentage Profit

$$= \frac{17 \times 100}{36} = 47\%$$



Case II : Percentage Profit

$$= \frac{24 \times 100}{50} = 48\%$$

Case III : Percentage Profit

$$= \frac{19 \times 100}{40} = 47.5\%$$

Case IV : Percentage Profit

$$= \frac{29 \times 100}{60} = 48.3\%$$

→ Obviously, (d) is the best transaction.

333. If the cost price of an article is 80% of its selling price, the profit percent is

- (a) 20% (b) $22\frac{1}{2}\%$
(c) 24% (d) 25%

Sol. (d) S.P. = ₹ 100

C.P. = ₹ 80

∴ Gain = ₹ 20

$$\therefore \text{Gain percent} = \frac{20}{80} \times 100 = 25\%$$

334. By selling an article, a man makes a profit of 25% of its selling price. His profit percent is

- (a) 20% (b) 25%
(c) $16\frac{2}{3}\%$ (d) $33\frac{1}{3}\%$

Sol. (d) $25\% = \frac{1}{4} \rightarrow P$
 $\frac{1}{4} \rightarrow SP$

$$CP = 4 - 1 = 3$$

$$\text{Profit}\% = \frac{1}{3} \times 100 = 33\frac{1}{3}\%$$

335. A retailer buys a radio for ₹ 225. His overhead expenses are ₹ 15. He sells the radio for ₹ 300. The profit percent of the retailer is

- (a) 25% (b) $26\frac{2}{3}\%$
(c) 20% (d) $33\frac{1}{3}\%$

Sol. Actual C.P. = 225 + 15

$$= ₹ 240$$

$$\text{Gain} = ₹ 300 - 240 = ₹ 60$$

$$\therefore \text{Gain Percent} = \frac{60}{240} \times 100 = 25\%$$

336. By selling a car for ₹ 64,000, Mr Pankaj lost 20%. Then the cost price of the car is ₹

- (a) 72,000 (b) 76,800
(c) 80,000 (d) 84,000

Sol. (3) cost price = $\frac{64000 \times 100}{80}$

$$= ₹ 80,000$$

∴ The cost price of car is ₹ 80,000

337. If there is a profit of 20% on the cost price of an article, the percentage of profit calculated on its selling price will be.

- (a) 24% (b) $16\frac{2}{3}\%$
(c) $8\frac{1}{3}\%$ (d) 20%

Sol. Required gain% = $\frac{20}{120} \times 100$

$$= \frac{50}{3} = 16\frac{2}{3}\%$$

338. A man purchased a bedsheet for ₹ 450 and sold it at a gain of 10% calculated on the selling price. The selling price of the bedsheet was ₹

- (a) 480 (b) 475
(c) 480 (d) 500

Sol. (d) $10\% = \frac{1}{10} \rightarrow P$
 $\frac{1}{10} \rightarrow SP$

$$CP = 10 - 1 = 9$$

$$9 \text{ units} = 450$$

$$1 \text{ units} = 50$$

$$SP (10 \text{ units}) = 50 \times 10 = \text{Rs. } 500$$

339. A man bought an old typewriter for ₹ 1200 and 200 spent on its Repair. He sold it for ₹ 1680. His profit percent is

- (a) 20% (b) 10%
(c) 8% (d) 16%

Sol. (a) Total cost of typewriter = ₹ (1200 + 200) = ₹ 1400.

$$S.P. = ₹ 1680$$

$$\text{Profit} = ₹ (1680 - 1400) = ₹ 280$$

$$\therefore \text{Profit \%} = \frac{280}{1400} \times 100 = 20\%$$

340. Krishna bought a Camera and paid 20% less than its original price. He sold it at 40% profit on the price he had paid. The percentage of profit earned by Krishna on the original price was

Sol. (c) Let CP = 100

$$\text{Actual CP} = 100 \times \frac{80}{100} = 80$$

$$SP = 80 \times \frac{140}{100}$$

$$SP = 112$$

$$\text{Profit}\% = \frac{(112 - 100)}{100} \times 100$$

$$= 12\%$$

341. By selling an article for ₹ 960 a man loss of 4%, what was the cost price?

- (a) ₹ 1000 (b) ₹ 784
(c) ₹ 498.4 (d) ₹ 300

Sol. (a) C.P. of article

$$= \frac{100}{100 - \text{loss}\%} \times \text{S.P.}$$

$$= \frac{100}{96} \times 960 = ₹ 1000$$

342. A Salesman expects a gain of 13% on his cost price. If in a month his sale was ₹ 7,91,000, what was his profit?

- (a) ₹ 85,659 (b) ₹ 76,800
(c) ₹ 91,000 (d) ₹ 84,000

Sol. (c) cost price = $\frac{791000 \times 100}{113}$

$$₹ 700000$$

$$\therefore \text{Gain} = 791000 - 700000$$

$$= ₹ 91,000$$

343. An article is sold at 5% profit. The ratio of selling price and cost price will be

- (a) 22 : 21 (b) 20 : 21
(c) 21 : 20 (d) 5 : 1

Sol. (c) Let CP of the Article = ₹ 100

According to question

$$100 \text{ (CP)} \xrightarrow{5\% \text{ profit}} 105 \text{ (SP)}$$

$$\text{Ratio of } \frac{SP}{CP} = \frac{105}{100} = \frac{21}{20}$$

$$\text{Ratio} = 21 : 20$$



344. If an article is sold at 200% profit then the ratio of its cost price to its selling price be

- (a) 1 : 2 (b) 2 : 1
(c) 1 : 3 (d) 3 : 1

Sol. (c) Let the CP of the Article is = ₹100

According to question

$$100 \text{ (CP)} \xrightarrow{+200\%} 300 \text{ (SP)}$$

$$\text{Ratio of } \frac{\text{CP}}{\text{SP}} = \frac{100}{300} = \frac{1}{3}$$

1 : 3

345. If 8 toys are sold at the cost price of 9 toys of the same kind. Find the profit percent.

- (a) $12\frac{1}{2}\%$ (b) $11\frac{1}{9}\%$
(c) $13\frac{1}{3}\%$ (d) 10%

Sol. (a) According to question
SP of 8 toys = CP of 9 toys

$$\frac{\text{SP}}{\text{CP}} = \frac{9}{8} \Rightarrow 1 \text{ gain}$$

$$\text{gain \%} = \frac{\text{gain}}{\text{CP}} \times 100$$

$$= \frac{1}{8} \times 100 = 12\frac{1}{2}\%$$

346. The ratio of cost price and selling price is 14 : 13, then find the loss percent is.

- (a) $7\frac{1}{7}\%$ (b) $14\frac{2}{7}\%$
(c) $11\frac{1}{9}\%$ (d) 15%

Sol. (a) According to question

$$\frac{\text{CP}}{\text{SP}} = \frac{14}{13} \Rightarrow 1 \text{ unit loss}$$

$$\text{Loss\%} = \frac{1}{14} \times 100 = 7\frac{1}{7}\% \text{ loss}$$

347. The ratio of selling price and cost price is 21 : 20, then find the profit percent is :

- (a) 20% (b) 5%
(c) $4\frac{16}{21}\%$ (d) $14\frac{2}{7}\%$

Sol. (b) According to question

$$\frac{\text{CP}}{\text{SP}} = \frac{20}{21} \Rightarrow 1 \text{ unit gain}$$

$$\text{Profit \%} = \frac{1}{20} \times 100 = 5\%$$

348. The cost price of 36 books is equal to the selling price of 30 books. The gain percent is

- (a) $88\frac{2}{6}\%$ (b) 18%
(c) 20% (d) $16\frac{4}{6}\%$

Sol. (c) 36 CP = 30 SP

$$\frac{\text{CP}}{\text{SP}} = \frac{30}{36} = \frac{5}{6} \Rightarrow 1 \text{ Profit}$$

$$\text{Profit \%} = \frac{\text{Profit}}{\text{CP}} \times 100$$

$$= \frac{1}{5} \times 100 = 20\%$$

349. If the cost price of 7 articles is equal to the selling price of 10 article, then the gain or loss percent is :

- (a) 30% loss (b) 40 loss
(c) $33\frac{1}{3}\%$ gain (d) $33\frac{1}{3}\%$ loss

Sol. (a) According to question
7 CP = 10 SP

$$\frac{\text{CP}}{\text{SP}} = \frac{10}{7} \Rightarrow 3 \text{ unit (loss)}$$

$$\text{Loss\%} = \frac{\text{Loss}}{\text{CP}} \times 100$$

$$= \frac{3}{10} \times 100 = 30\%$$

350. The cost price of 9 articles is equal to the selling price of 8 articles. The profit or loss percent in the transaction is :

- (a) $12\frac{1}{2}\%$ loss
(b) 13% loss
(c) $12\frac{1}{2}\%$ profit
(d) 12% profit

Sol. (c) According to question
9 CP = 8 SP

$$\frac{\text{CP}}{\text{SP}} = \frac{8}{9} \Rightarrow 1 \text{ Profit}$$

$$\text{Profit \%} = \frac{1}{8} = 12\frac{1}{2}\%$$

351. If the cost price of 12 apples is equal to selling price of 10 apples, then the percentage of profit is

- (a) 25% (b) 20%
(c) 18% (d) $16\frac{2}{3}\%$

Sol. (b) CP × 12 = SP × 10

$$\frac{\text{CP}}{\text{SP}} = \frac{10}{12} = \frac{5}{6} \Rightarrow 1 \text{ gain}$$

$$\text{gain \%} = \frac{1}{5} \times 100 = 20\%$$

352. If the selling price of 9 articles is equal to the cost price of 10 articles, then find the gain or loss percent is

- (a) $11\frac{1}{9}\%$ loss
(b) $1\frac{12}{13}\%$ loss
(c) $11\frac{1}{9}\%$ profit
(d) $7\frac{6}{17}\%$ profit

Sol. (c) According to question
SP × 9 = CP × 10

$$\frac{\text{CP}}{\text{SP}} = \frac{9}{10} \Rightarrow 1 \text{ Profit}$$

$$\text{Profit \%} = \frac{1}{9} \times 100 = 11\frac{1}{9}\%$$

353. The selling price of 20 oranges is equal to the cost price of 25 oranges. Find the gain percent is

- (a) 25% (b) 24%
(c) 23% (d) 20%

Sol. (a) According to question

$$\text{SP} \times 20 = \text{CP} \times 25$$

$$\frac{\text{CP}}{\text{SP}} = \frac{20}{25} = \frac{4}{5} \Rightarrow 1 \text{ gain}$$

$$\text{Profit \%} = \frac{1}{4} \times 100 = 25\%$$



354. If the selling price of 15 articles is equal to the cost price of 18 articles, then find the gain or loss percent ?

- (a) 18% (b) 15%
(c) 25% (d) 20%

Sol. (d) According to question
 $SP \times 15 = CP \times 18$

$$\frac{CP}{SP} = \frac{15}{18} = \frac{5}{6} \Rightarrow 1 \text{ unit gain}$$

$$\text{gain \%} = \frac{1}{5} \times 100 = 20\%$$

355. If the cost price of 3 apples is equal to the selling price of 5 apples then find the gain or loss percent?

- (a) 80% (b) 40%
(c) 60% (d) 50%

Sol. (b) According to question
 $CP \times 3 = SP \times 5$

$$\frac{CP}{SP} = \frac{5}{3} \Rightarrow 2 \text{ unit loss}$$

$$\text{Loss \%} = \frac{2}{5} \times 100 = 40\%$$

356. If selling price of an article is $\frac{8}{5}$ times its cost price, then find the gain or loss percent?

- (a) 60% loss
(b) 50% gain
(c) $33\frac{1}{3}\%$ loss
(d) $16\frac{2}{3}\%$ loss

Sol. (a) According to question

$$SP = \frac{8}{5} \times CP$$

$$\frac{CP}{SP} = \frac{5}{8} \Rightarrow 3 \text{ gain}$$

$$\text{gain \%} = \frac{3}{5} \times 100 = 60\%$$

357. If the ratio of cost price to selling price is 10 : 11, then find the profit percent ?

- (a) 10% (b) 20%
(c) 40% (d) 50%

Sol. (a) According to question
 $CP : SP$

$$\begin{array}{c} 10 : 11 \\ \text{+1 gain} \end{array}$$

$$\text{gain \%} = \frac{1}{10} \times 100 = 10\%$$

358. If the cost price of an article is 80% of the selling price. The profit percent is.

- (a) 24% (b) 25%
(c) 20% (d) $6\frac{1}{4}\%$

Sol. (b) According to question
 $CP = 80\% \text{ of } SP$

$$CP = \frac{80}{100} SP$$

$$\frac{CP}{SP} = \frac{80}{100} = \frac{4}{5} \Rightarrow 1 \text{ gain}$$

$$\text{gain \%} = \frac{1}{4} \times 100 = 25\%$$

359. If the selling price of 12 articles is equal to the cost price of 15 articles then find the gain percent?

- (a) 21% (b) 18%
(c) 20% (d) 25%

Sol. (d) According to question
 $SP \times 12 = CP \times 15$

$$\frac{CP}{SP} = \frac{12}{15} = \frac{4}{5} \Rightarrow 1 \text{ gain}$$

$$\text{gain \%} = \frac{1}{4} \times 100 = 25\%$$

360. If the selling price of 320 oranges is equal to the cost price of 400 oranges, then find the profit percent?

- (a) $6\frac{1}{4}\%$ (b) 25%
(c) 24% (d) 23%

Sol. $SP \times 320 = CP \times 400$

$$\frac{CP}{SP} = \frac{320}{400} = \frac{4}{5} \Rightarrow 1 \text{ gain}$$

$$\text{Profit \%} = \frac{1}{4} \times 100 = 25\%$$

361. The selling price of 18 bananas is equal to the cost price of 24 bananas find the gain or loss percent?

- (a) $33\frac{1}{3}\%$ (b) 40%
(c) $13\frac{1}{3}\%$ (d) $16\frac{2}{3}\%$

Sol. (a) According to question
 $SP \times 18 = CP \times 24$

$$\frac{CP}{SP} = \frac{18}{24} = \frac{3}{4} \Rightarrow 1 \text{ gain}$$

$$\text{gain \%} = \frac{1}{3} \times 100 = 33\frac{1}{3}\%$$

362. If the selling price of 18 tables is equal to the cost price of 10 tables then find the loss percent is?

- (a) $37\frac{1}{2}\%$ (b) $16\frac{2}{3}\%$
(c) $44\frac{4}{9}\%$ (d) $33\frac{1}{3}\%$

Sol. (c) According to question
 $SP \times 18 = CP \times 10$

$$\frac{CP}{SP} = \frac{18}{10} = \frac{9}{5} \Rightarrow 4 \text{ loss}$$

$$\text{Loss \%} = \frac{4}{9} \times 100 = 44\frac{4}{9}\%$$

363. Jony's salary is reduced by 10%. In order to have his salary back to his original amount. It must be raised by

- (a) $11\frac{1}{9}\%$ (b) 10%
(c) $12\frac{1}{3}\%$ (d) $9\frac{1}{11}\%$

Sol. (a) According to question

$$\begin{array}{c} 10 \xrightarrow{-10\%} 9 \\ \text{1 unit} \end{array}$$

to back to original salary it must be raised 1 unit

$$\text{raise \%} = \frac{1}{9} \times 100 = 11\frac{1}{9}\%$$



364. A shopkeeper gains 40%. While buying the goods and 60%. While selling them. Find his total gain percent.

- (a) 120% (b) 125%
(c) 124% (d) 113%

Sol. (c) According to question

$$\begin{aligned} \text{total gain} &= a + b + \frac{a \times b}{100} \\ &= 40 + 60 + \frac{40 \times 60}{100} = 124\% \end{aligned}$$

365. If the cost price is 95% of the selling price, what is the profit percent?

- (a) 4% (b) 4.75%
(c) 5% (d) 5.26%

Sol. (d) If the cost price be ₹ x, then

$$\begin{aligned} \text{SP} &= \frac{100x}{95} = ₹ \frac{20}{19}x \\ \therefore \text{gain} &= \frac{20x}{19} - x = ₹ \frac{x}{19} \\ \therefore \text{gain percent} &= \frac{\frac{x}{19}}{x} \times 100 \\ &= 5.26\% \end{aligned}$$

Alternate:-

$$\text{C.P} = \text{S.P} \times \frac{95}{100}$$

$$\frac{\text{C.P}}{95} : \frac{\text{S.P}}{100}$$

$$\frac{\text{C.P}}{19} : \frac{\text{S.P}}{20}$$

$$\text{Profit}\% = \frac{1}{19} \times 100 = 5.26$$

366. The cost price of 15 articles is same as the selling price of 10 articles. Find the gain or loss percent?

- (a) 30% (b) 40%
(c) 50% (d) 45%

Sol. (c) Suppose the CP of each article = ₹ 1

Then,

$$\text{CP of 10 articles} = ₹ 10$$

$$\text{SP of 10 articles} = ₹ 15$$

$$\therefore \text{Profit} = ₹ 5$$

$$\begin{aligned} \% \text{ Profit} &= \frac{5 \times 100}{10} \\ &= 50\% \end{aligned}$$

367. The selling price of 5 articles is the same as the cost price of 3 articles. Find gain or loss %?

- (a) 20% gain
(b) 25 % gain
(c) 33.33 % gain
(d) 40 % loss

Sol. (d) 5 S.P = 3 C.P

$$\frac{\text{S.P}}{3} : \frac{\text{C.P}}{5}$$

$$\text{Loss}\% = \frac{2}{5} \times 100 = 40\%$$

368. If the cost price of 15 tables be equal to the selling price of 20 tables, the loss percent is?

- (a) 20% (b) 30%
(c) 25% (d) 37.5%

Sol. (c) Let the cost price of one table = x

$\therefore$ Cost price of 15 tables = 15x
and cost price of 20 tables = 20x
According to the question,
Selling price of 20 tables = cost price of 15 table = 15x

$$\therefore \text{Loss} = 20x - 15x = 5x$$

$$\therefore \text{Loss \%} = \frac{5x}{20x} \times 100 = 25\%$$

Alternate:-

$$15 \text{ C.P} = 20 \text{ S.P}$$

$$\frac{\text{C.P}}{20} : \frac{\text{S.P}}{15}$$

$$\text{Loss}\% = \frac{5 \times 100}{20} = 25\%$$

369. The cost price of 18 articles is equal to the selling price of 15 articles. The gain percent is ?

- (a) 15% (b) 20%
(c) 25% (d) 18%

$$\text{Sol. (b) gain \%} = \frac{18-15}{15} \times 100$$

$$= \frac{3}{15} \times 100 = 20\%$$

370. If the cost price of 50 oranges is equal to the selling price of 40 oranges, then profit percent is ?

- (a) 5% (b) 10%
(c) 20% (d) 25%

Sol. (d) Let the CP of one orange = 1

$$\therefore \text{CP of 40 oranges} = ₹ 40$$

$$\text{and SP of 40 oranges} = ₹ 50$$

$$\therefore \text{Profit} = ₹ (50 - 40) = ₹ 10$$

$$\therefore \text{Profit percent} = \frac{10}{40} \times 100 = 25\%$$

Alternate:-

$$50 \text{ C.P} = 40 \text{ S.P}$$

$$\frac{\text{C.P}}{40} : \frac{\text{S.P}}{50}$$

$$\text{Profit}\% = \frac{10 \times 100}{40} = 25\%$$

371. If the cost price of 12 oranges is equal to the selling price of 10 oranges, then the percentage of profit is.

- (a) $16\frac{2}{3}\%$ (b) 20%
(c) 18% (d) 25%

Sol. (b) Let CP of each oranges be = ₹ 1

$$\text{Then CP of 10 oranges} = ₹ 10$$

$$\text{SP of 10 oranges} = ₹ 12$$

$$\text{gain \%} = \left(\frac{2}{10} \times 100 \right) \% = 20\%$$

372. If the cost price of 12 pens is equal to the selling price of 8 pens, the gain percent is?

- (a) $33\frac{1}{3}\%$ (b) $66\frac{2}{3}\%$
(c) 25% (d) 50%

Sol. (d) Let the CP of each pen = ₹ 1

$$\therefore \text{CP of 8 pens} = ₹ 8$$

$$\text{SP of 8 pens} = ₹ 12$$

$$\text{gain \%} = \frac{4}{8} \times 100 = 50\%$$

373. Pankaj purchased a radio at $\frac{9}{10}$

of its selling price and sold it at 8% more than its original selling price its gain percent is

- (a) 20% (b) 18%
(c) 10% (d) 8%



Sol. (a) Let the original selling price of radio = ₹ 100

$$\therefore \text{CP of radio} = ₹ 90$$

$$\therefore \text{New selling price} = ₹ 108$$

$$\therefore \text{Gain percent} = \frac{18}{90} \times 100 = 20\%$$

374. If the cost price of 10 articles is equal to the selling price of 16 articles, then the loss % is?

- (a) 30% (b) 37.5%
(c) 42.5% (d) 45%

Sol. (b) Loss percent = $\frac{16-10}{16} \times 100$
 $= \frac{6}{16} \times 100 = 37.5\%$

375. If the selling price of 4 articles is equal to the cost price of 5 articles, the profit percent is?

- (a) 20% (b) $22\frac{1}{2}\%$
(c) 25% (d) 30%

Sol. (c) If the CP of each article be ₹ 1, then

$$\text{CP of 4 articles} = ₹ 4$$

$$\text{SP of 4 articles} = ₹ 5$$

$$\therefore \text{Profit percent}$$

$$= \frac{5-4}{4} \times 100 = 25\%$$

376. The selling price of 10 oranges is equal to the cost price of 13 oranges. Then the profit percentage is ?

- (a) 30% (b) 10%
(c) 13% (d) 3%

Sol. (a) S.P of 10 Oranges = C.P of 13 Oranges

$$\frac{\text{S.P}}{13} : \frac{\text{C.P}}{10}$$

$$\text{Profit}\% = \frac{3}{10} \times 100 = 30\%$$

377. The cost price of 24 apples is the same as the selling price of 18 apples. The percentage of gains is?

- (a) $12\frac{1}{2}\%$ (b) $14\frac{2}{3}\%$

- (c) $16\frac{2}{3}\%$ (d) $33\frac{1}{3}\%$

Sol. (d) Let the CP of 1 apple = ₹ 1

$$\therefore \text{CP of 18 apples} = ₹ 18$$

$$\text{SP of 18 apples} = ₹ 24$$

$$\therefore \text{Gain percent} = \frac{6}{18} \times 100$$

$$= \frac{100}{3} = 33\frac{1}{3}\%$$

378. The cost price of 20 oranges is same with selling price of 16 oranges. The profit percentage is?

- (a) 30% (b) 20%
(c) 25% (d) 16%

Sol. (c) gain percent

$$= \frac{20-16}{16} \times 100$$

$$= \frac{4}{16} \times 100 = 25\%$$

379. The cost price of 40 articles is the same as the selling price of 25 articles. Find the gain percent ?

- (a) 65% (b) 60%
(c) 15% (d) 75%

Sol. (b) 40 C.P = 25 S.P

$$\frac{\text{C.P}}{25} : \frac{\text{S.P}}{40}$$

$$\text{Profit}\% = \frac{15}{25} \times 100 = 60\%$$

380. Somi buys 144 items at 90 paise each. On the way 20 items are broken. She sells the remaining at ₹ 1.20 each. her gain percent to one place decimal is?

- (a) 13.8% (b) 14.6%
(c) 14.8% (d) 15.8%

Sol. (c) 20 items are broken out of 144 items

$$\therefore \text{CP of 124 item} = \left(\frac{144 \times 90}{100} \right)$$

$$= ₹ 129.60$$

$$\text{Total SP} = ₹ (1.20 \times 124) = ₹ 148.8$$

$$\therefore \text{gain ₹ } (148.80 - 129.60) = ₹ 19.20$$

$$\therefore \text{gain percent} = \frac{19.20}{129.60} \times 100 = 14.8\%$$

381. If goods are purchased for ₹ 450 and one third sold at a loss of 10%. At what gain should the remaining be sold so as to gain 20% on the whole transaction?

- (a) 32% (b) 35%
(c) 28% (d) 30%

Sol. (b) Let the required gain % = x

$$\therefore 150 \times \frac{90}{100} + 300 \times \frac{(100+x)}{100}$$

$$= \frac{450 \times 120}{100}$$

$$\Rightarrow 135 + 3(100+x) = 540$$

$$3(100+x) = 540 - 135 = 405$$

$$\therefore 100+x = \frac{405}{3} = 135$$

$$\Rightarrow x = 135 - 100 = 35\%$$

Alternate:-

Let total articles = 3

Article	Profit/loss	
1	$\times -10$	= -10
2	$\times x$	= 70
3	$\times 20$	= 60

$$\therefore 2 \times x = 70$$

$$x = 35\%$$

382. Goutam had to sell vegetables worth ₹ 5,750 for ₹ 4500 due to heavy rainfall. What is the loss percentage that he has incurred.

- (a) 21.74% (b) 23.47%
(c) 20% (d) 23.45%

Sol. (a) Loss percent = $\frac{\text{Loss}}{\text{CP}} \times 100$

$$= \frac{5750 - 4500}{5750} \times 100$$

$$= \frac{125000}{5750} = 21.74\%$$

383. Pankaj purchases an article for ₹ 3,550 and spends ₹ 50 on it for its repair. If he then sold the article for ₹ 3816, the percent of profit is?



(a) 6% (b) 6.08%

(c) 7.38% (d) 7.49%

Sol. (a) Actual CP of article
 $= ₹ (3550 + 50) = ₹ 3600$
 gain $= 3816 - 3600 = ₹ 216$
 $\therefore$ gain percent

$$= \frac{216}{3600} \times 100 = 6\%$$

384. Rahul sold his goods at half the list price and thus lost 20%. If he had sold on the listed price, his gain percentage would be?

(a) 60% (b) 20%

(c) 72% (d) 35%

Sol. (a) Marked price of article
 $= ₹ x$, and CP = 100 (let)

$$\therefore \frac{x}{2} = 80 \Rightarrow x = ₹ 160$$

gain on selling at the marked price = 60%

385. By selling 20 metres of a cloth Seema gains the selling price of 4 metres of cloth. The gain % is?

(a) 25 (b) 30

(c) 35 (d) 20

Sol. (a) SP of 20 metres of cloth = CP of 20 metres of cloth + SP of 4 metres of cloth
 $\Rightarrow$ SP of $(20 - 4 = 16)$ metre = CP of 20 meter.

$$\therefore \text{gain \%} = \frac{20 - 16}{16} \times 100$$

$$= \frac{100}{4} = 25\%$$

386. Ten articles were bought for ₹ 8 and sold at 8 for ₹ 10. The gain percent is?

(a) 54.75% (b) 57.25%

(c) 56.25% (d) 55%

Sol. (c) Let 40 articles bought (LCM of 8 and 10)

$$\therefore \text{CP of 40 articles} = \frac{8 \times 40}{10} = ₹ 32$$

$$\text{Their SP} = \frac{10 \times 40}{8} = ₹ 50$$

$$\therefore \text{Profit percent} = \frac{50 - 32}{32} \times 100 = 56.25\%$$

387. If Pankaj purchases cashew nut at ₹ 250 per kg and sells it at ₹ 10 per 50 gms, then he will have

(a) 25% loss (b) 25% Profit

(c) 20% Profit (d) 20% Loss

Sol. (d) $\therefore$ CP of 1000 gm of cashewnut = ₹ 250

$\therefore$ CP of 50 gm of cashew nut

$$= \frac{250}{1000} \times 50 = ₹ 12.5$$

SP of 50 gm of cashew nut = ₹ 10

$$\therefore \text{Loss percent} = \frac{2.5 \times 100}{12.5} = 20\%$$

388. Cost price of 100 books is equal to the selling price of 60 books. The gain percentage/loss percentage is

(a) $66\frac{3}{2}\%$ (b) 67%(c) 66% (d) $66\frac{2}{3}\%$

Sol. (d) CP of each book = ₹ 1

$\therefore$ CP of 60 books = ₹ 60

Their SP = ₹ 100

$$\therefore \text{Gain percent} = \frac{100 - 60}{60} \times 100$$

$$= \frac{200}{3} = 66\frac{2}{3}\%$$

389. Somi purchased $2\frac{1}{2}$ dozen eggs

at the rate of ₹ 20 per dozen. She found that 6 eggs were rotten. She sold the remaining eggs at the rate of ₹ 22 per dozen. Then her profit or loss percent is.

(a) 12% loss (b) 12% Profit

(c) 10% loss (d) 10% Profit

Sol. (a) CP of $2\frac{1}{2}$ dozen (30 eggs) =

$$\frac{20}{12} \times 30 = ₹ 50$$

Their SP i.e, SP of 24 eggs

$$= 22 \times 2 = ₹ 44$$

$$\therefore \text{Loss} = ₹ (50 - 44) = ₹ 6$$

$$\therefore \text{Loss \%} = \frac{6}{50} \times 100 = 12\%$$

390. A man purchases some oranges at the rate of 3 for ₹ 40 and the same quantity at 5 for ₹ 60. If he sells all the oranges at the rate of 3 for ₹ 50. Find his gain or loss% (to nearest integer)

(a) 32% profit (b) 31% loss

(c) 34% loss (d) 31% Profit

Sol. (a) Let the man buy 15 oranges

$\therefore$ CP of 15 oranges at 3 for ₹ 40

$$= \frac{40}{3} \times 15 = ₹ 200$$

Again CP of 15 oranges at 5 for ₹

$$60 = \frac{60}{5} \times 15 = ₹ 180$$

$$\therefore \text{Total C.P.} ₹ (200 + 180) = ₹ 380$$

$$\text{S.P. of oranges} = \frac{50}{3} \times 30 = ₹ 500$$

$$\therefore \text{Profit} = ₹ (500 - 380) = ₹ 120$$

$$\therefore \text{Profit \%} = \frac{120}{380} \times 100$$

$$= 31.58\% \approx 32\%$$

391. An article is sold at profit of 25%. If the selling price is doubled the profit will be?

(a) 200% (b) 50%

(c) 100% (d) 150%

Sol. (d) C.P. of article = 100 (let)

$$\therefore \text{S.P.} = ₹ 125$$

$$\text{New S.P.} = ₹ 250$$

$$\text{Profit percent} = \frac{250 - 100}{100} \times 100$$

$$= 150\%$$

392. A man purchased an article for ₹ 1500 and sold it at 25% above the cost price. If he has to pay ₹ 75 tax on it, his net profit percent will be

(a) 20% (b) 25%

(c) 30% (d) 15%

$$\text{Sol. (a) S.P. of article} = \frac{1500 \times 125}{100}$$

$$= ₹ 1875$$



Net S.P. after paying tax

$$= (1875 - 75) = ₹ 1800$$

$$\therefore \text{Profit} = 1800 - 1500 = ₹ 300$$

$$\therefore \text{Profit percent} = \frac{300}{1500} \times 100$$

$$= 20\%$$

393. If a man were to sell his handcourt for ₹ 720, he would lose 25%. At what price must he sell it to gain 25%?

(a) ₹ 1200 (b) ₹ 960

(c) ₹ 1152 (d) ₹ 768

Sol. (a) C.P of hand-court

$$= \frac{100}{75} \times 720 = ₹ 960$$

For 25% profit

$$\text{S.P.} = \frac{125}{100} \times 960$$

$$= \frac{5}{4} \times 960 = ₹ 1200$$

394. A fruit seller buys oranges at the rate of 10 per dozen and sells at the rate of 12 per dozen. His gain percent is?

(a) 20% (b) 15%

(c) 12% (d) $8\frac{1}{3}\%$

Sol. (a) Profit percent

$$= \frac{12-10}{10} \times 100$$

$$= \frac{2}{10} \times 100 = \frac{100}{5} = 20\%$$

395. Oranges are bought at rate of 7 for ₹ 3. At what rate per hundred must they be sold to gain 33%

(a) ₹ 56 (b) ₹ 60

(c) ₹ 58 (d) ₹ 57

Sol. ((D) Cost price of 1 orange = ₹ $\frac{3}{7}$

$$\therefore \text{Cost price of 100 oranges}$$

$$= \frac{3}{7} \times 100 = \frac{300}{7}$$

$$\therefore 100\% = \frac{300}{7}$$

$$\therefore 133\% = \frac{300}{7} \times \frac{133}{100}$$

$$= ₹ 57$$

396. A man buys 12 articles for ₹ 12 and sells them at the rate of ₹ 1.25 per article. His gain percent-age is

(a) 20% (b) 25%

(c) 15% (d) 18%

Sol. (b) Cost price = 12

$$\text{Selling price} = 12 \times 1.25 = 15$$

$$\text{Total profit} = 15 - 12 = 3$$

$$\% \text{ gain} = \frac{3}{12} \times 100$$

$$= \frac{1}{4} \times 100 = 25\%$$

397. A shopkeeper marks his goods 10% above his cost Price. If he allows his customers 10% discount on the marked price. How much profit or loss does he make if any?

(a) 1% gain (b) 5% gain

(c) 5% loss (d) 1% loss

Sol. (d) Loss % = $\frac{x \times y}{100} \%$

$$= \frac{10 \times 10}{100} = 1\%$$

Alternative = (I) +10% -10%

$$\begin{array}{cc} +\frac{1}{10} & \frac{1}{10} \\ 10 & 11 \\ \frac{10}{100} & \frac{9}{99} \\ \hline & 1 \end{array}$$

$$\% = \frac{1}{100} \times 100 = 1\%$$

Alternative : (II)

$$\text{Let C.P of goods} = ₹ 100$$

$$\text{M.P of goods} = 110\% \text{ of } 100$$

$$= \frac{110}{100} \times 100 = 110$$

After discount S.P of goods
= 90% of 110

$$= \frac{90}{100} \times 110 = ₹ 99$$

$$\text{Loss} = 100 - 99 = ₹ 1$$

$$\text{Loss \%} = \frac{1}{100} \times 100$$

$$= 1\% \text{ loss}$$

398. A bookseller marks his goods 20% above the cost Price. He allows his customers a discounts of 8% on marked price. Find out his profit percent?

(a) 11% (b) 10%

(c) 10.4% (d) 10.3%

Sol. (c) +20% + $\frac{1}{5}$

$$\begin{array}{cc} -8\% = -\frac{2}{25} \\ 5 & 6 \end{array}$$

$$\begin{array}{cc} \frac{25}{125} & \frac{23}{138} \\ \hline & 13 \end{array}$$

$$\% = \frac{13}{125} \times 100 = 10.4\%$$

399. A company marks its goods 20% above the cost Price. Its allows customer a discount of 30% on marked price. Find out gain or loss percent of the company?

(a) 10% loss (b) 16% gain

(c) 6% gain (d) 10% loss

Sol. (a) +20% + $\frac{1}{5}$

$$\begin{array}{cc} -30\% & -\frac{3}{10} \\ 5 & 6 \end{array}$$

$$\begin{array}{cc} \frac{10}{50} & \frac{7}{42} \\ \hline & 8 \end{array}$$

$$\text{Loss \%} = \frac{8}{50} \times 100 = 16\%$$

400. A tradesman mark his goods at

$$11\frac{1}{9}\% \text{ above the cost price. He}$$



allows his customer a discount of 10% on the marked price. Find out the gain or loss percent?

- (a) 10 loss
(b) 1% gain
(c) 1% loss
(d) No gain, No loss

Sol. (d) $+11\frac{1}{9}\% = +\frac{1}{9}$ $-10\% = -\frac{1}{10}$

$$\frac{9}{90} = \frac{10}{90}$$

No gain No loss

401. Mohit marks his goods 20% above cost price but allows $22\frac{2}{9}\%$ discount for cash. Find out his gain or loss percent?

- (a) $6\frac{2}{3}\%$ gain (b) $6\frac{2}{3}\%$ loss
(c) $16\frac{2}{3}\%$ gain (d) $16\frac{2}{3}\%$ loss

Sol. (b) According to question

$$+20\% = \frac{1}{5} \quad -22\frac{2}{9}\% = -\frac{2}{9}$$

$$\frac{5}{9} \quad \frac{6}{7}$$

$$\frac{9}{45} \quad \frac{7}{42}$$

$$\frac{3}{3}$$

$$\text{Loss \%} = \frac{3}{45} \times 100 = 6\frac{2}{3}\% \text{ Loss}$$

402. A discount of 15% on a article is the same as discount of 20% on a second article. The cost of the two article can be.

- (a) ₹ 60, ₹ 80 (b) ₹ 80, ₹ 60
(c) ₹ 85, ₹ 80 (d) ₹ 60, ₹ 40

Sol. (b) Let the C.P of Ist and IInd article
= ₹ x + ₹ y

According to question
15% of x = 20% of y

$$\frac{15}{100} \times x = \frac{20}{100} \times y$$

$$\frac{x}{y} = \frac{20}{15} = \frac{4}{3}$$

By option only (b) is 4 : 3 sequence is ₹ 80, ₹ 60

403. The printed price of an article is ₹ 900 but the retailer gets a discount of 40%. He sells the article for ₹ 900. Retailer's gain percent is :

- (a) $66\frac{2}{3}\%$ (b) $68\frac{1}{3}\%$
(c) 40% (d) 60%

Sol. (a) According to question
C.P of article = 60% of 100 = ₹ 60
S.P of article = ₹ 100

$$\text{Profit \%} = \frac{40}{60} \times 100 = 66\frac{2}{3}\%$$

Alternative:-

CP of article = 60% of 900

$$= \frac{60}{100} \times 900 = ₹ 540$$

S.P of article = ₹ 900

$$\text{Profit} = 900 - 540 = ₹ 360$$

$$\text{Profit \%} = \frac{360}{540} \times 100 = \frac{200}{3}$$

$$= 66\frac{2}{3}\%$$

404. The marked price of an item is twice the cost price. For a gain of 15% the discount should be

- (a) 42.5% (b) 20.5%
(c) 7.5% (d) 32.5%

Sol. (a) According to question

Let the CP = ₹ 100

$$\text{MP} = 100 \times 2 = ₹ 200$$

Now for 15% Profit SP

$$= 100 \times \frac{115}{100} = ₹ 115$$

$$\% \text{ discount} = \frac{200 - 115}{200} \times 100$$

$$= 42.5\%$$

405. A shopkeeper buys an article for ₹ 360. He was to make a gain of 25% on it after a discount of 10% The marked price is

- (a) ₹ 550 (b) ₹ 450
(c) ₹ 525 (d) ₹ 500

Sol. (d) According to question
M.R.P of the article

$$= 360 \times \frac{125}{100} \times \frac{100}{90}$$

$$= ₹ 500$$

406. After allowing 20% discount a shopkeeper wishes to sell a book for ₹ 800. At what price must the book be marked?

- (a) ₹ 1200 (b) ₹ 900
(c) ₹ 1000 (d) ₹ 1050

Sol. (c) MP of the book = $800 \times \frac{100}{80}$
= ₹ 1000

407. A shopkeeper after allowing 25% discount wishes to sell a TV for ₹ 7500. At what price must the TV be marked?

- (a) ₹ 800 (b) ₹ 10,000
(c) ₹ 9500 (d) ₹ 11,000

Sol. (b) MP of the TV = $7500 \times \frac{100}{75}$
= ₹ 10,000

408. A book-seller after 8% discount on all his books and still makes profit of 15%. If a books is marked ₹ 250, then cost price is?

- (a) ₹ 187 (b) ₹ 200
(c) ₹ 230 (d) ₹ 180

Sol. (b) According to question
CP of book

$$= 250 \times \frac{92}{100} \times \frac{100}{115} = ₹ 200$$

409. The marked price of a dress in ₹ 200. After allowing a discount of 20% on the marked price the shopkeeper makes a profit of ₹ 16. Find the gain percent?

- (a) $11\frac{1}{9}\%$ (b) $9\frac{1}{11}\%$

- (c) 10% (d) $12\frac{1}{2}\%$



Sol. (a) SP of the dress

$$= 200 \times \frac{80}{100} = ₹160$$

$$\text{CP of dress} = 160 - 16$$

$$= ₹ 144$$

$$\text{Profit \%} = \frac{16}{144} \times 100$$

$$= \frac{100}{9} \% = 11 \frac{1}{9} \%$$

410. The marked price of a Saree is ₹ 400. After allowing a discount of 30%. On the marked price the dealer makes a profit of ₹ 40. Find the gain percent?

(a) $12 \frac{1}{2} \%$ (b) $66 \frac{2}{3} \%$

(c) $16 \frac{2}{3} \%$ (d) $11 \frac{1}{9} \%$

Sol. (c) SP of the Saree

$$= 400 \times \frac{70}{100} = 280$$

$$\text{CP of the Saree} = 280 - 40$$

$$= ₹ 240$$

$$\text{Profit \%} = \frac{40}{240} \times 100$$

$$= \frac{100}{6} = \frac{50}{3} \% = 16 \frac{2}{3} \%$$

411. A Radio dealer after a discount of 10% and still makes a profit of 26%. What does he pay for a radio whose marked price is ₹ 840?

(a) 600 (b) 550

(c) 450 (d) 375

Sol. (a) According to question
CP of the Radio

$$840 \times \frac{90}{100} \times \frac{100}{126} = ₹ 600$$

412. A shopkeeper allows a discount of 10% on the marked price. What percent above the cost price must he mark his goods to make a profit of 17 percent?

(a) 21% (b) $22 \frac{2}{9} \%$

(c) 30% (d) 40%

Sol. (c) Let the CP = ₹ 100

$$\text{SP} = \frac{100+17}{100} \times 100 = ₹ 117$$

$$\text{MP} = 117 \times \frac{100}{100-10}$$

$$= ₹ 130$$

$$\text{Required \%} = \frac{130-100}{100} \times 100$$

$$= 30\%$$

413. The cost price of chair is ₹ 3200. A merchant wants to make 25% gain by selling it at the time of sale he declares a discount of 20% on the marked price. The marked price is

(a) 4500 (b) 4000

(c) 6000 (d) 5000

Sol. (d) According to question
MP of the chair

$$= 3200 \times \frac{125}{100} \times \frac{100}{80}$$

$$= ₹ 5000$$

414. Goutam Yadav allows 4% discount on the marked price of his goods and still earns a profit of 20%. What is the cost price of a dress if its marked price is ₹ 850?

(a) 680 (b) 700

(c) 720 (d) 650

Sol. (a) According to question
CP of the dress

$$= 850 \times \frac{96}{100} \times \frac{100}{120}$$

$$= ₹ 680$$

415. Deepu saves ₹ 25 on the purchase of an article on which a discount of 20% is allowed. How much did he pay?

(a) ₹ 50 (b) ₹ 100

(c) ₹ 150 (d) ₹ 125

Sol. (b) 20% → ₹ 25

$$100\% \rightarrow 25 \times 5 = ₹ 125$$

$$\text{He pay } 80\% \rightarrow 25 \times 4$$

$$= ₹ 100$$

416. A shopkeeper buys a machine at a discount of 15% and sells it for ₹ 1955. Thus he makes a profit of 15%. The discount is

(a) ₹ 302 (b) ₹ 410

(c) ₹ 310 (d) ₹ 300

Sol. Let marked price of machine = ₹ x
CP for the retailer

$$= \frac{1955 \times 100}{115}$$

$$= ₹ 1700$$

$$\therefore x \times \frac{85}{100} = 1700$$

$$\text{Mark Price (x)} = \frac{1700 \times 100}{85}$$

$$= ₹ 2000$$

$$\therefore \text{Discount} = 2000 - 1700$$

$$= ₹ 300$$

417. A shopkeeper buys an article listed at ₹ 100 and gets successive discounts of 10% and 20%. He spends 10% of the cost price on transportation. At what price should he sell the article to earn a profit of 15%?

(a) ₹ 91.20 (b) ₹ 92

(c) ₹ 90.80 (d) ₹ 91.08

Sol. According to question

Single equivalent discount

$$\left(10 + 20 - \frac{10 \times 20}{100} \right) \%$$

$$= (30 - 2)\% = 28\%$$

$$\therefore \text{CP of article} = 100 - 28 = ₹ 72$$

Actual cost price of article

$$= \frac{72 \times 110}{100} = ₹ 79.2$$

$$\therefore \text{For a profit of } 15\%$$

$$\text{Required SP} = \frac{79.2 \times 115}{100}$$

$$= ₹ 91.08$$

418. A trader purchases 25 windows at 25% discount of the total price of ₹ 1,20,000. If the builder receives an additional discount of ₹ 7500 for the purchase then the cost of each window is

(a) 3200 (b) 3100

(c) 3400 (d) 3300



Sol. (d) CP of 25 windows

$$= \frac{120000 \times 75}{100} = ₹ 90,000$$

After additional discount

$$\text{CP for builder} = ₹(90000 - 7500) \\ = ₹ 82500$$

∴ Cost of each window

$$= \frac{82500}{25} = ₹ 3300$$

419. After allowing a discount of 10%. On marked price a shopkeeper makes a gain of 15%. The ratio of the marked price to the cost price is.

- (a) 23 : 19 (b) 23 : 18
(c) 23 : 9 (d) 23 : 10

Sol. (b) Let marked price = ₹ x and cost price = ₹ y

According to question

$$\frac{x \times 90}{100} = \frac{y \times 115}{100}$$

$$\frac{x}{y} = \frac{115}{90} = \frac{23}{18}$$

$$x : y = 23 : 18$$

420. For a certain article if discount is 25% then the profit is 25%. If the discount is 10% then the profit is.

- (a) $33\frac{1}{3}\%$ (b) 30%
(c) 40% (d) 50%

Sol. Let the marked price be x and cost price by Rs 100, then

$$\frac{x \times 75}{100} = 125$$

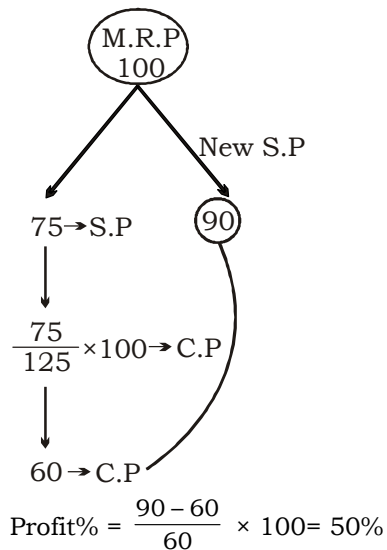
$$x = \frac{125 \times 100}{75} = ₹ \frac{500}{3}$$

SP after a discount of 10%

$$\frac{500}{3} \times \frac{90}{100} = ₹ 150$$

$$\therefore \text{gain \%} = 50\%$$

Alternate:-



421. A reduction of 20% in the price of Sugar enables a customer to purchase 12.5 kg more for ₹ 800. The original price of Sugar (per kg) is

- (a) ₹ 15 (b) ₹ 14
(c) ₹ 12 (d) ₹ 16

Sol. (d) Let original price of Sugar = x/kg

$$\text{New price} = \frac{4x}{5} \text{ Per kg}$$

$$\therefore \frac{800}{4x/5} - \frac{800}{x} = 12.5$$

$$800 \left(\frac{5}{4x} - \frac{1}{x} \right) = 12.5$$

$$800 \left(\frac{5-4}{4x} \right) = 12.5$$

$$\frac{800}{4x} = 12.5 \Rightarrow x = \frac{200}{12.5}$$

$$= ₹ 16 \text{ kg}$$

Alternate:-

$$-20\% = \frac{-1}{5}$$

Original : New

$$\text{Price} \rightarrow 5 : 4$$

$$\text{Quantity} \rightarrow 4 : 5$$

$$1 \text{ Unit} = 12.5 \text{ kg.}$$

$$\text{Original Quantity} = 4 \text{ Unit} = 4 \times 12.5 = 50$$

$$\text{Original Price} = \frac{800}{50} = 16 \text{ kg.}$$

422. The cost of manufacture of a tape recorder is ₹1500. The manufacture fixes the marked price 20% above the cost of manufacture and allows a discount in such a way as to get a profit of 8%. The rate of discount is

- (a) 10% (b) 8%
(c) 20% (d) 12%

Sol. (a) Marked price of tape recorder

$$= \frac{1500 \times 120}{100} = ₹ 1800$$

$$\text{gain} = \frac{1500 \times 8}{100} = ₹ 120$$

$$\text{Discount} = 1800 - (1500 + 120) \\ = ₹ 180$$

Let discount percent = x% then

$$\frac{1800 \times x}{100} = 180, x = 10\%$$

Alternate:-

$$\text{C.P} = 100$$

$$\text{M.R.P} = 100 \times \frac{120}{100} = 120$$

$$\text{S.P} = \frac{100 \times 108}{100} = 108$$

$$\% \text{Discount} = \frac{120-108}{120} \times 100 = 10\%$$

423. With a 5% discount on the cost of Sugar a buyer could purchase 2kg more sugar for ₹ 608 selling price of sugar is.

- (a) ₹ 16 (b) ₹ 15
(c) ₹ 15.50 (d) ₹ 16.50

Sol. Let the original sp of sugar be x per kg

SP after discount

$$= ₹ \frac{95x}{100} \text{ per kg}$$

$$= ₹ \frac{19x}{20} \text{ per kg}$$

$$\therefore \frac{608}{\frac{19x}{20}} - \frac{608}{x} = 2$$

$$\Rightarrow 608 \left(\frac{20}{19x} - \frac{1}{x} \right) = 2$$

$$\frac{608}{19x} = 2$$



$$\Rightarrow x = \frac{608}{19 \times 2} = ₹ 16$$

Alternate:-

$$-5 = \frac{-1}{20}$$

Original : New

Price $\rightarrow 20 : 19$

Quantity $\rightarrow 19 : 20$

1 Unit = 2

Quantity unit = $2 \times 19 = 38$

Selling price of quantity = $\frac{608}{38} = 16$

424. A grocery dealer cheats the extent of 10% while buying as well as on selling. What is his increase in the profit percentage?

- (a) 20% (b) 21%
(c) 22% (d) None of these

Sol. (b) According to question, cheats while buying = 10%

$$\therefore \left(a + b + \frac{ab}{100} \right) \%$$

$$\Rightarrow 10 + 10 + \frac{10 \times 10}{100} = 20 + 1$$

Increase in profit % = 21%
according to SSC the above answer is correct but correct answer is below

Let 100 gm at ₹100

1st case $\Rightarrow$ He purchase 110 instead of 100

2nd case $\Rightarrow$ He sell 90 gm instead of 100

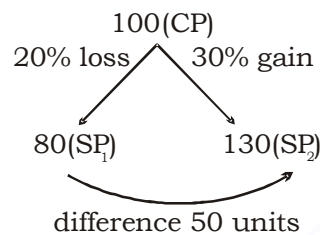
Quantity (gm)	Value (₹)
110 $\times$ 90	100 $\times$ 90 = 9000
90 $\times$ 110	100 $\times$ 110 = 11000
(on equating the quantity)	

$$\begin{aligned} \text{Then profit \%} &= \frac{2000}{9000} \times 100 \\ &= \frac{200}{9} = 22\frac{2}{9} \% \end{aligned}$$

425. A book vendor sold a book at a loss of 20%. Had he sold it for ₹ 108 more, he would have earned a profit of 30%. Find the cost price of the book.

- (a) ₹ 216 (b) ₹ 648
(c) ₹ 240 (d) ₹ 432

Sol. (a) Let CP of the book = 100
According to question,



50 units = ₹ 108

$$1 \text{ units} = \frac{108}{50}$$

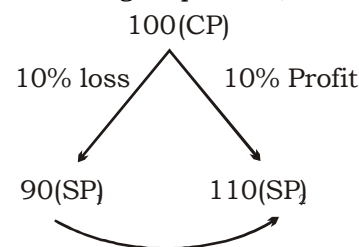
$$100 \text{ units} = \frac{108}{50} \times 100 = ₹ 216$$

$$\therefore \text{CP} = ₹ 216$$

426. A book vendor sold a book at a loss of 10%. Had he sold it for ₹ 108 more, he would have earned a profit of 10%. Find the cost price of the book.

- (a) ₹ 442 (b) ₹ 540
(c) ₹ 648 (d) ₹ 740

Sol. (b) Let CP of the book = 100
According to question,



Difference 20 units

20 units = ₹ 108

$$1 \text{ unit} = ₹ \frac{108}{20}$$

$$100 \text{ units} = \frac{108}{20} \times 100 = ₹ 540$$

CP = ₹ 540

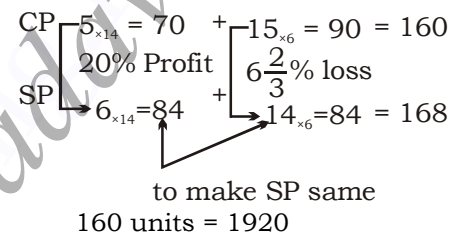
427. Goutam bought two radio for ₹ 1,920. He sold one at a profit of

20% and the other at a loss $6\frac{2}{3}\%$

If the selling price of both radios are same, then find the cost price of both radios?

- (a) ₹ 800 and ₹ 1120
(b) ₹ 840 and ₹ 1080
(c) ₹ 860 and ₹ 1060
(d) ₹ 900 and ₹ 1020

Sol. (b) According to question,
Radio -1 Radio -2



$$1 \text{ unit} = \frac{1920}{160} = 12$$

$$70 \text{ units} = 12 \times 70 = 840$$

$$90 \text{ units} = 12 \times 90 = 1080$$

CP of both Radio = ₹ 840, ₹ 1080

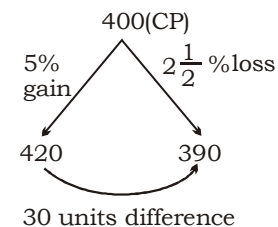
428. The reduction of ₹ 12 in the selling price of an article will change

5% gain into $2\frac{1}{2}\%$ loss. The cost

price of the article is

- (a) ₹ 450 (b) ₹ 160
(c) ₹ 360 (d) ₹ 540

Sol. (b) Let CP of the article = 400
According to question,



30 units = 12

$$1 \text{ unit} = \frac{12}{30}$$

$$400 \text{ units} = \frac{12}{30} \times 400$$

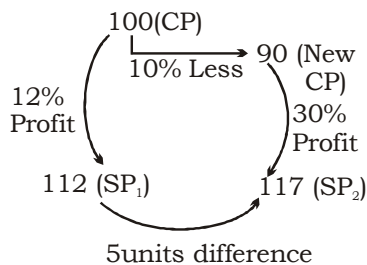
CP of the article = ₹ 160



429. An article was sold at a profit of 12%. If the cost price would be 10% less and selling price would be ₹ 5.75 more, there would be profit of 30%. Then at what price it should be sold to make a profit of 20%?

(a) ₹ 115 (b) ₹ 120
(c) ₹ 138 (d) ₹ 215

Sol. (c) Let the CP of the article = 100
According to question,



$$5 \text{ units} = ₹ 5.75$$

$$1 \text{ unit} = \frac{5.75}{5}$$

$$100 \text{ units} = \frac{5.75}{5} \times 100 = 115 \text{ to gain } 20\%$$

$$\therefore \text{CP of the article} = ₹ 115$$

$$\therefore \text{SP of article} = 115 + \frac{20}{100} \times 115 = ₹ 138$$

430. By selling a table for ₹ 1140, a man loses 5%. In order to gain 5% the table must be sold for

(a) ₹ 1260 (b) ₹ 1320
(c) ₹ 1180 (d) ₹ 1250

Sol. (a) Let CP of the table is = 100 units

According to question,

$$100(\text{SP}) \xrightarrow{5\% \text{ loss}} 95(\text{SP})$$

$$95 \text{ units} = 1140$$

$$1 \text{ unit} = \frac{1140}{95} = 12$$

$$100 \text{ units} = 12 \times 100 = 1200$$

CP of the table = ₹ 1200

SP of the table to gain 5% profit

$$= 1200 \times \frac{105}{100} \Rightarrow ₹ 1260$$

431. A radio dealer sold a radio at a loss of 2.5%. Had he sold it for ₹ 100 more he would have gained

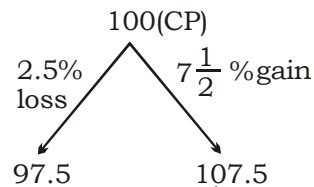
$$7\frac{1}{2}\%. \text{ In order to gain } 12\frac{1}{2}\% \text{ he}$$

should sell it for

(a) ₹ 1080 (b) ₹ 1125
(c) ₹ 850 (d) ₹ 925

Sol. (b) Let CP of the ratio = 100 units

According to question



10 units difference

$$10 \text{ units} = 100$$

$$1 \text{ unit} = 10$$

$$100 \text{ units} = 10 \times 100 = 1000$$

$$\text{CP of the ratio} = ₹ 1000$$

$$\text{to gain } 12\frac{1}{2}\% \text{ SP of the ratio}$$

$$= 1000 + \frac{12.5}{100} \times 1000 = ₹ 1125$$

432. By selling a fan ₹ 600 a man loses 10%. To make a gain of 20%, the selling price of the fan should be

(a) ₹ 900 (b) ₹ 1000
(c) ₹ 700 (d) ₹ 800

Sol. (d) Let CP of the selling fan = 100 unit

According to question,

$$100(\text{CP}) \xrightarrow{10\% \text{ loss}} 90(\text{SP})$$

$$90 \text{ units} = 600$$

$$1 \text{ unit} = \frac{20}{3}$$

$$100 \text{ units} = \frac{20}{3} \times 100 = \frac{2000}{3}$$

to gain 20% SP of fan

$$= \frac{2000}{3} + \frac{20}{100} \times \frac{2000}{3} = \frac{2400}{3} = 800$$

433. On selling an article for ₹ 170, a shopkeeper loses 15%. In order to gain 20%, he must sell that article at rupees?

(a) 215.50 (b) 212.50
(c) 240 (d) 210

Sol. (c) Let the CP of the article = 100
According to question,

$$100(\text{CP}) \xrightarrow{15\% \text{ loss}} 85(\text{SP})$$

$$85 \text{ units} = 170$$

$$1 \text{ unit} = \frac{170}{85} = 2$$

$$100 \text{ units} = 2 \times 100 = 200$$

$$\text{CP of the article} = ₹ 200$$

In order to gain 20% SP of the article

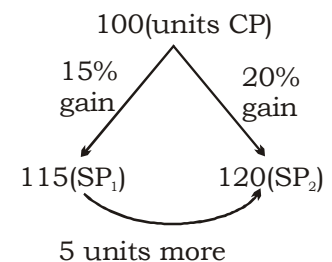
$$= 200 \times \frac{120}{100} = 240$$

$$\text{New Selling Price} = ₹ 240$$

434. An article is sold at a gain of 15%. Had it been sold for ₹ 27 more. The profit would have been 20%. The cost Price of the article is

(a) ₹ 500 (b) ₹ 700
(c) ₹ 540 (d) ₹ 545

Sol. (c) Let CP of the article = 100 units



$$5 \text{ units} = 27$$

$$1 \text{ unit} = \frac{27}{5}$$

$$100 \text{ units} = \frac{27}{5} \times 100$$

$$= ₹ 540$$

$$\text{CP of the article} = ₹ 540$$

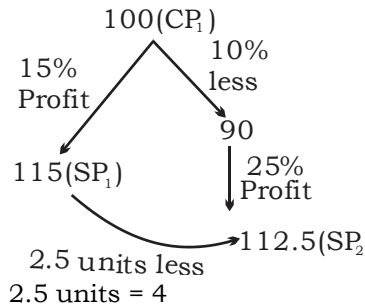
435. A man sells an article at a gain of 15%. If he bought it at 10% less and sold it for ₹ 4 less, he would have gained 25%. The cost price of the article is

(a) ₹ 140 (b) ₹ 150
(c) ₹ 160 (d) ₹ 185



Sol. (c) Let CP of the article = 100

According to question,



$$1 \text{ unit} = \frac{4}{2.5}$$

$$100 \text{ units} = \frac{4}{2.5} \times 100 = 160$$

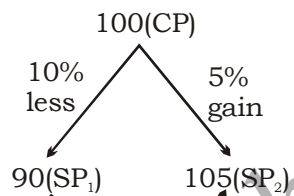
C.P of the article = ₹ 160

436. An article is sold at a loss of 10%. Had it been sold for ₹ 90 more, there would have been a gain of 5%. The original sale price of the article (in ₹) is:-

- (a) 540 (b) 600
(c) 628 (d) 650

Sol. (a) Let CP of the article = 100

According to question,



$$15 \text{ units} = 90$$

$$1 \text{ unit} = 6$$

$$100 \text{ units} = 6 \times 100 = 600$$

∴ CP of the article = ₹ 600

$$90 \text{ units} = \frac{90}{15} \times 90 = 540$$

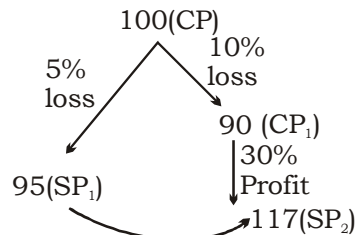
∴ Original SP = ₹ 540

437. A businessman bought an article and sold it at a loss of 5%. If he had bought it for 10% less and sold it for ₹ 33 more, he would have had a profit of 30%. The cost price of the article is

- (a) ₹ 330 (b) ₹ 155
(c) ₹ 150 (d) ₹ 300

Sol. (c) Let CP of the article = 100

According to question,



$$22 \text{ units} = 33$$

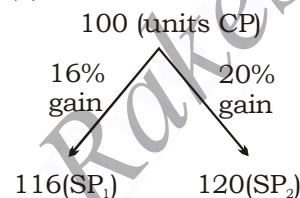
$$1 \text{ unit} = \frac{3}{2}$$

$$100 \text{ units} = \frac{3}{2} \times 100 = 150$$

438. An article was sold at 16% gain. Had it been sold for ₹ 200 more, the gain would have been 20%. Then the cost price of the article.

- (a) ₹ 5000 (b) ₹ 4800
(c) ₹ 4500 (d) ₹ 5200

Sol. (a) Let CP of the article = 100 units



$$4 \text{ units} = 200$$

$$1 \text{ unit} = 50$$

$$100 \text{ units} = 50 \times 100 = 5000$$

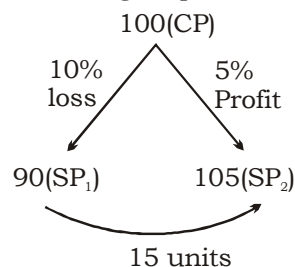
CP = ₹ 5000

439. Joni sold his watch at 10% loss. If he had sold it for ₹ 45 more, he would have made 5% profit. The cost price (in ₹) of the watch was

- (a) 300 (b) 900
(c) 110 (d) 270

Sol. (a) Let CP of the article = 100

According to question,



$$15 \text{ units} = 45$$

$$1 \text{ unit} = 3$$

$$100 \text{ units} = 3 \times 100 = 300$$

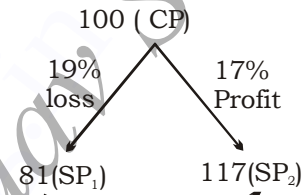
C.P of the article = ₹ 300

440. An article is sold at profit of 17%. Had it been sold for Rs. 162 less, it would have cost a loss of 19%. Find the cost price of article.

- (a) 360 (b) 450
(c) 540 (d) 600

Sol. (b) Let C.P of article = Rs. 100

According to question,



$$36 \text{ units} = 162$$

$$1 \text{ unit} = \frac{162}{36}$$

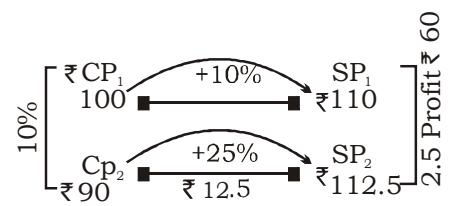
$$100 \text{ units} = \frac{162}{36} \times 100 = 450$$

∴ CP of the article = ₹ 450

441. A dealer sold a bicycle at a profit of 10%. Had he bought the bicycle at 10% less price and sold it at price ₹ 60 more, he would have gained 25%. The cost price of the bicycle was:

- (a) ₹ 2400 (b) ₹ 2200
(c) ₹ 2000 (d) ₹ 2600

Sol. (a) According to question,



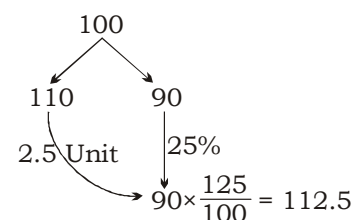
$$\therefore 2.5 \text{ units} \dots\dots 60$$

$$1 \text{ unit} \dots\dots = 24$$

Therefore, C.P of bicycle = 100 units = 100 × 24 = 2400

C.P = ₹ 2400

Alternate:-





2.5 Unit = 60

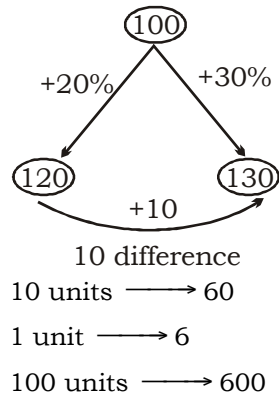
1 Unit = Rs. 24

C.P of Bicycle = 100 Unit = $100 \times 24 = 2400$

442. A radio is sold at a profit of 20%. Had it been sold for ₹ 60 more than profit would have been 30%. The cost price of the radio is

(a) ₹ 600 (b) ₹ 620
(c) ₹ 550 (d) ₹ 500

Sol. (a) Let the C.P of the radio
According to question,

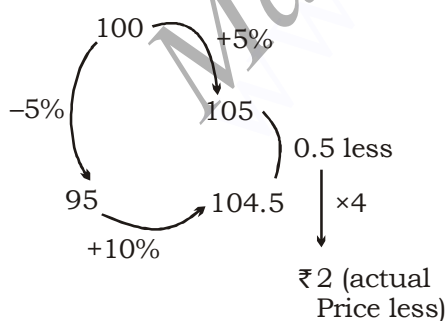


∴ CP of the radio = ₹ 600

443. A man sells an article at 5% above its cost price. If he had bought it at 5% less than what he had paid for it and sold it at ₹ 2 less, he would have gained 10%. The cost price of the article is:

(a) ₹ 300 (b) ₹ 400
(c) ₹ 200 (d) ₹ 100

Sol. (b) Let CP = 100

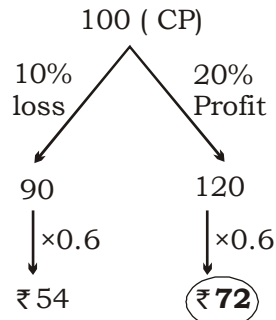


C.P of the article = $100 \times 4 = ₹ 400$

444. There would be a 10% loss. If rice is sold at ₹ 54 per kg. To earn a profit of 20%, the price of rice per kg will be

(a) ₹ 72 (b) ₹ 70
(c) ₹ 63 (d) ₹ 65

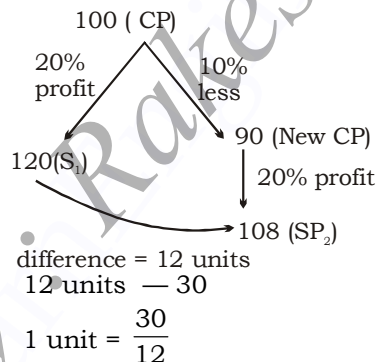
Sol. (a)



445. Seema wants to sell a watch at a profit of 20% she bought it at 10% less and sold it at ₹ 30 less, but still she gained 20%. The cost price of watch

(a) ₹ 240 (b) ₹ 250
(c) ₹ 220 (d) ₹ 225

Sol. (b) Let CP of the watch = 100
According to question,

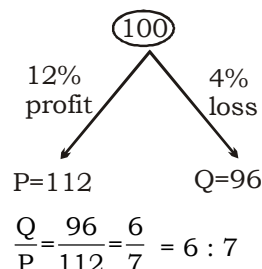


100 units = $\frac{30}{12} \times 100 = 250$
CP of the watch = ₹ 250

446. A profit of 12% is made when a mobile phone is sold at ₹ P and there is 4% loss when the phone is sold at ₹ Q. Then Q:P is

(a) 1:1 (b) 6:7
(c) 4:5 (d) 3:1

Sol. (b) Let CP = 100



447. By selling an article for ₹ 450. I lose 20% for what amount, should I sell it to gain 20%?

(a) ₹ 675 (b) ₹ 450
(c) ₹ 490 (d) ₹ 562.50

Sol. (a) for gaining 20% it should be

$$= \frac{450}{80\%} \times 120\% = ₹ 675$$

448. A shopkeeper sold an article at a loss of 20%. But if he could sell it at ₹ 200 more, he could earn a profit of 5%. The cost price of the article is

(a) ₹ 600 (b) ₹ 800
(c) ₹ 100 (d) ₹ 1200

Sol. (b) 20% Loss → 5% Profit

Increase by 25%

$$25\% = 200$$

$$1\% = 8$$

$$CP = 100\% = 8 \times 100 = ₹ 800$$

449. By selling some goods at ₹ 31, a salesman loses 7% on his output, find the percentage profit or loss, when he sells the same at ₹ 35.

(a) loss 7% (b) Profit 5%
(c) loss 5% (d) Profit 7%

Sol. (b) S.P of goods = ₹ 31

$$CP \text{ of goods} = 31 \times \frac{100}{93} = ₹ \frac{100}{3}$$

$$\text{Profit} = 35 - \frac{100}{3} = \frac{5}{3}$$

$$\text{Profit}\% = \frac{\frac{5}{3}}{\frac{100}{3}} \times 100 = 5\%$$

450. A dealer makes a profit of 20% even after giving a 10% discount on the advertised price of a scooter. If he makes a profit of ₹ 7500 on the sale of the scooter. The advertised price was

(a) ₹ 45000 (b) ₹ 47500
(c) ₹ 50000 (d) ₹ 52500

Sol. (c) According to question,

$$\frac{CP}{SP} = \frac{100}{120} > 20\% \text{ Profit}$$

$$\frac{MP}{SP} = \frac{100}{90} > 10\% \text{ Discount}$$

$$\frac{CP}{SP} = \frac{100}{120} = \frac{5}{6}, \frac{MP}{SP} = \frac{100}{90} = \frac{10}{9}$$



$$\frac{CP}{SP} = \frac{5}{6}, \frac{MP}{SP} = \frac{10}{9}$$

$$\therefore \begin{array}{ccc} \text{C.P} & \text{S.P} & \text{M.P} \\ 45 & 54 & 60 \end{array}$$

9 units Profit

$$9 \text{ units} \longrightarrow 7500$$

$$1 \text{ unit} \longrightarrow \frac{7500}{9}$$

$$60 \text{ units} \longrightarrow \frac{7500}{9} \times 60$$

$$= 50,000$$

$$MP = ₹ 50,000$$

451. The marked price of a watch was ₹ 720. A man bought the same for ₹ 550.80, after getting two successive discounts, the first 10%. What was the second discount rate?

- (a) 18% (b) 15%
(c) 14% (d) 12%

Sol. (b) M.P of a watch = ₹ 720

After 1st discount = 90% of 720

$$= \frac{90}{100} \times 720 = ₹ 648$$

C.P of watch = ₹ 550.80

$$\text{Difference} = 648 - 550.80 \\ = ₹ 97.20$$

$$\text{II}^{\text{nd}} \text{ Discount} = \frac{97.20}{648} \times 100 \\ = \frac{9720}{648} = 15\%$$

452. The marked price of a watch is ₹ 1000. a retailer buys it at ₹ 810 after getting two successive discounts of 10%, and another rate which is eligible. What is the second discount rate?

- (a) 6.5% (b) 8%
(c) 10% (d) 15%

Sol. (c) M.P of watch = ₹ 1000

After 1st discount = 90% of 1000

$$= \frac{90}{100} \times 1000 = ₹ 900$$

C.P of watch = ₹ 810

$$\text{Difference} = 900 - 810 = ₹ 90$$

$$\text{II}^{\text{nd}} \text{ Discount \%} = \frac{90 \times 100}{900} = 10\%$$

453. The marked price of a cycle is ₹ 800. A shopkeeper gives two successive discounts and sells the cycle at ₹ 612. If the first discount is 10%, the second discount is

- (a) 15% (b) 12%
(c) 10% (d) 8%

Sol. (a) M.P of cycle = ₹ 800

After 1st discount = 90% of 800

$$= \frac{90}{100} \times 800 = ₹ 720$$

S.P of cycle = ₹ 612

IInd discount%

$$= \frac{720 - 612}{720} \times 100$$

$$= \frac{108}{720} \times 100 = 15\%$$

454. A shopkeeper gives two successive discounts on an article marked ₹ 450. The first discount given is 10%. If the customer pays ₹ 344.25 for the article, the second discount given is

- (a) 18% (b) 15%
(c) 14% (d) 12%

Sol. (b) M.P of an article = ₹ 450

$$\text{After 1st discount} = 450 \times \frac{90}{100} \\ = ₹ 405$$

C.P of an article = ₹ 344.25

$$\text{Difference} = 405 - 344.25 \\ = ₹ 60.75$$

$$\text{II}^{\text{nd}} \text{ discount} = \frac{60.75}{405} \times 100 = 15\%$$

455. The marked price of a shirt and trousers are in the ratio 1:2. The shopkeeper gives 40% discount on the shirt. If the total discount on the shirt and trousers is 30%, the discount offered on the trouser is

- (a) 30% (b) 25%
(c) 20% (d) 15%

Sol. (b) Let the M.P of Shirt and trousers is

₹ 100 and ₹ 200

Shirt C.P = 60% of 100 = ₹ 60

Total C.P of shirt and trousers = 70% of 300

$$= \frac{70}{100} \times 300 = ₹ 210$$

C.P of trousers = 210 - 60 = ₹ 150

Discount of trousers = 200 - 150 = ₹ 50

$$\text{Discount \%} = \frac{50}{200} \times 100 = 25\%$$

456. A pen is listed for ₹ 12. A discount of 15% is given on it. A second discount is given bringing the price down to ₹ 8.16. The rate of second discount is

- (a) 20% (b) 15%
(c) 18% (d) 25%

Sol. (a) M.P of Pen = ₹ 12

$$\text{After 1st discount} = \frac{85}{100} \times 12$$

$$= ₹ 10.20$$

$$\text{S.P} = ₹ 8.16$$

IInd discount%

$$= \frac{10.20 - 8.16}{10.20} \times 100$$

$$= \frac{2.04}{10.20} \times 100 = 20\%$$

457. An article is listed at ₹ 920. A customer pays ₹ 742.90 for it after getting two successive discounts. If the rate of first discount is 15%, the rate of 2nd discount is

- (a) 12% (b) 8%
(c) 5% (d) 3%

Sol. (c) M.P of an article = ₹ 920

After 1st Discount

$$= \frac{85}{100} \times 920 = ₹ 782$$

Customer paid = ₹ 742.90

IInd Discount %

$$= \frac{782 - 742.90}{782} \times 100$$

$$= \frac{39.10}{782} \times 100 = 5\%$$



458. The marked price of watch was ₹ 820. A man bought the watch for ₹ 570.72 after getting two successive discounts, of which the first was 20%. The second discount was

- (a) 18% (b) 15%
(c) 13% (d) 11%

Sol. (c) M.P of watch = ₹ 820

$$\text{After Ist Discount} = \frac{80}{100} \times 820$$

$$= ₹ 656$$

Men purchased = ₹ 570.72

IInd discount %

$$= \frac{656 - 570.72}{656} \times 100$$

$$= \frac{85.28}{656} \times 100 = 13\%$$

459. The marked price of a T.V is ₹ 16,000. After two successive discount it is sold for ₹ 11,400. If the first discount is 5%, then the rate of second discount is

- (a) 15% (b) 20%
(c) 30% (d) 25%

Sol. (d) M.P of T.V = ₹ 16,000

$$\text{After Ist discount} = \frac{95}{100} \times 16,000$$

$$= ₹ 15200$$

$$\text{S.P of T.V} = 11400$$

IInd discount %

$$= \frac{15200 - 11400}{15200} \times 100$$

$$\Rightarrow \frac{3800}{15200} \times 100 = 25\%$$

460. A fan is listed at ₹ 1500 and a discount of 20% is offered on the list price. What additional discount must be offered to the customer now to bring the net price to ₹ 1104?

- (a) 12% (b) 15%
(c) 10% (d) 8%

Sol. (d) L.P (List price) of fan = ₹ 1500
After discount, L.P

$$= \frac{80}{100} \times 1500 = ₹ 1200$$

$$\text{Net price of fan} = 1104$$

$$\text{Difference} = 1200 - 1104 = ₹ 96$$

Additional discount

$$= \frac{96}{1200} \times 100 = 8\%$$

461. A dealer marks his goods 20% above the cost price. He then allows some discount on marked price so that he makes a profit of 10%. The rate of discount is

(a) $10\frac{1}{3}\%$ (b) $9\frac{1}{3}\%$

(c) $8\frac{2}{3}\%$ (d) $8\frac{1}{3}\%$

Sol. (d) Let C.P of goods = ₹ 100

$$\text{M.P of goods} = 120\% \text{ of } 100$$

$$= ₹ 120$$

$$\text{S.P of goods} = 110\% \text{ of } 100$$

$$= ₹ 110$$

$$\text{Discount\%} = \frac{10}{120} \times 100$$

$$= \frac{25}{3}\% = 8\frac{1}{3}\%$$

462. The marked price of a watch is ₹ 1600. The shopkeeper gives successive discount of 10% and x% to the customer. If the customer pays ₹ 1224 for the watch, the value of x is

- (a) 5% (b) 10%
(c) 15% (d) 20%

Sol. (c) M.P of watch = ₹ 1600

After Ist discount of 10%

$$= 1600 \times \frac{90}{100} = ₹ 1440$$

Customer pays (final SP)

$$= ₹ 1224$$

IInd Discount%

$$= \frac{(1440 - 1224) \times 100}{1440}$$

$$= \frac{216}{1440} \times 100 = 15\%$$

463. An article of cost price ₹ 8,000 is marked at ₹ 11,200, After allowing a discount of x% a profit of 12% is made. The value of x is

- (a) 21% (b) 20%
(c) 22% (d) 23%

Sol. (b) Cost price of the article = ₹ 8000

$$\text{Profit} = 12\%$$

S.P of the article

$$= 8000 \times \frac{112}{100} = ₹ 8960$$

$$\therefore \text{Discount} = \text{MP} - \text{SP}$$

$$\Rightarrow 11200 - 8960 = ₹ 2240$$

Let the discount% = x%

$$\therefore \frac{11200 \times x}{100} = 2240$$

$$x = \frac{2240 \times 100}{11200} = 20\%$$

Alternate:-

$$\frac{100 - D\%}{100 + P\%} = \frac{\text{C.P}}{\text{M.P}} \Rightarrow \frac{100 - x}{100 + 12} = \frac{5}{7}$$

$$\frac{100 - x}{112} = \frac{5}{7}$$

$$700 - 7x = 560$$

$$7x = 700 - 560 = 140$$

$$x = 20\%$$

464. The printed price of a book is ₹ 320. a retailer pays ₹ 244.80 for it. He gets successive discounts of 10% and an another rate. His second rate is:

- (a) 12% (b) 14%
(c) 16% (d) 15%

Sol. (d) M.P of book = ₹ 320

S.P after Ist discount

$$= 320 \times \frac{90}{100} = ₹ 288$$

$$\text{Final S.P} = ₹ 244.80$$

Second discount

$$= ₹ 288 - 244.80 = ₹ 43.2$$

Second discount%

$$\frac{43.2}{288} \times 100 = 15\%$$

465. A mobile phone is listed at ₹ 1,500 and a discount of 10% is offered on the list price. what additional discount must be offered to the customer now to bring the net price to ₹ 1242?



(a) 18% (b) 12%

(c) 8% (d) 10%

Sol. (c) L.P of mobile phone = ₹ 1500
After discount price

$$= \frac{90}{100} \times 1500 = ₹ 1350$$

Net Price = ₹ 1242

$$\text{Discount} = \frac{1350 - 1242}{1350} \times 100$$

$$= \frac{108}{1350} \times 100 = 8\%$$

466. A machine is marked at ₹ 6800 and available at a discount of 10%. The shopkeeper gives another off season discount to the buyer and sells the machine for ₹ 5202. Find the off season discount?

(a) 10% (b) 12%

(c) 15% (d) 18%

Sol. (c) Price after discount of 10%

$$= \frac{6800 \times 90}{100} = ₹ 6120$$

If the seasonal discount be $x\%$,

$$\text{then } \frac{6120 \times x}{100} = 6120 - 5202 = 918$$

$$x = \frac{918 \times 100}{6120}$$

$x = 15\%$

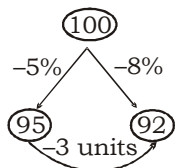
467. While selling an electric bulb a dealer gives a discount of 5%. If he gives a discount of 8%, he earns ₹ 36 less as profit. The marked price of the bulb is:

(a) ₹ 1000 (b) ₹ 1200

(c) ₹ 800 (d) None of these

Sol. (b) Let the marked price of the bulb = 100 units

According to the question,



3 units = 36

1 unit = 12

100 units = $12 \times 100 = 1200$

$\therefore$ MP of the bulb = ₹ 1200

468. A trader marks his goods at ₹ 900 and gives discount of 25%. If he earns 12.5% profit find the cost price of his goods?

(a) ₹ 500 (b) ₹ 600

(c) ₹ 720 (d) None of these

Sol. (b) **CP** : **MP**

$(100 - 25) : (100 + 12.5)$

75 : 112.5

2 : 3

$\downarrow \times 300$ $\downarrow \times 300$

600 : 900

cost price of article = ₹ 600

469. Nishant Yadav and Joni both are dealers of Goutam Helicopters. The price of Goutam Helicopter is ₹ 28,000. Nishant Yadav gives a discount of 10% on the whole while Joni gives a discount of 12% on the first ₹ 20,000 and 8% on the rest ₹ 8000. what is the difference between their selling price?

(a) ₹ 240 (b) ₹ 420

(c) ₹ 640 (d) ₹ 720

Sol. (a) Cost price of Goutam helicopter = ₹ 28,000

Selling price for Nishant Yadav

$$= 28,000 \times \frac{(100 - 10)}{100} = ₹ 25,200$$

Selling price for Joni

$$= \frac{20000 \times 88}{100} + \frac{8000 \times 92}{100}$$

$$= 17600 + 7360 = ₹ 24960$$

Difference between S.P

$$= 25,200 - 24960 = ₹ 240$$

Alternate:-

Discount given by Nishant Yadav

$$= 28000 \times \frac{10}{100} = ₹ 2800$$

Discount given by Joni

$$= \left(20,000 \times \frac{12}{100} \right) + \frac{8000 \times 8}{100}$$

$$\Rightarrow ₹ 3040$$

Note : Cost price is same in both cases so the difference in selling price is same as difference in discount
 $\therefore$ Difference in discount = $(3040 - 2800) = ₹ 240$

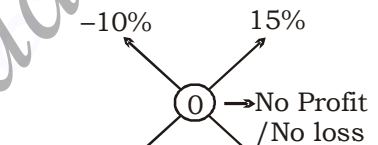
470. A trader sells two articles, one at a loss of 10% and another at a profit of 15% but finally there is no loss or gain. If the total sale price of these two articles is ₹ 30,000, find the difference between their cost prices.

(a) ₹ 5000 (b) ₹ 6000

(c) ₹ 7500 (d) None of these

Sol. (b) Loss % = -10%, Profit % = 15%

By alligation rule,



Ratio of cost 15 : 10

Price $\rightarrow$ 3 : 2

According to the question,

Let $CP_1 = 300$ units, $CP_2 = 200$ units

$$SP_1 = \frac{300 \times 90}{100} = 270 \text{ units}$$

$$SP_2 = \frac{200 \times 115}{100} = 230 \text{ units}$$

Total SP = $270 + 230 = 500$ units

500 units = ₹ 30,000

1 unit = ₹ 60

100 units = ₹ $60 \times 100 = ₹ 6000$

Difference in cost price = ₹ 6000

Alternate : Let CP of both the article are x and y respectively

According to the question,

$$10x = 15y$$

$$\frac{x}{y} = \frac{3}{2}$$

Ratio of cost prices = 3:2

Note: Now Further you can solve the question same as above.

471. A dealer buys a product at ₹ 1920. He sells at a discount of 20%. After gaining 20% Profit What is the marked price of that product?

(a) ₹ 2880 (b) ₹ 1536

(c) ₹ 2200 (d) ₹ 2527



Sol. (a) Let CP of the article = 100 units

$$\therefore SP = \frac{120}{100} \times 100 = 120 \text{ units}$$

$$MP = \frac{120}{(100 - 20)} \times 100 = 150 \text{ units}$$

$$\begin{array}{ccc} CP & : & SP & : & MP \\ 100 & : & 120 & : & 150 \\ 100 \text{ units} & = & ₹ 1920 \end{array}$$

$$1 \text{ unit} = ₹ \frac{1920}{100}$$

$$150 \text{ units} = \frac{1920}{100} \times 150 = ₹ 2880$$

472. A shopkeeper sold 12 cameras at a profit of 20% and 8 cameras at profit of 10%. If he has sold all 20 cameras at 15% profit then his profit would have been reduced by ₹ 36. What is the cost price of each camera?

- (a) 100 (b) 150
(c) 180 (d) 220

Sol. (c) According to the question,
 $(12 \times 20 + 8 \times 10)\% - (20 \times 15)\% = ₹ 36$
 $320\% - 300\% = 36$

$$1\% = \frac{36}{20}$$

$$100\% = \frac{36}{20} \times 100 = ₹ 180$$

cost price of the camera = ₹ 180

Alternate → Note → We can solve this question by help of option also.

option (c) →

$$(180 \times 12 \times \frac{120}{100} + 180 \times 8 \times \frac{110}{100}) -$$

$$(180 \times 20 \times \frac{115}{100})$$

$$(18 \times 144 + 144 \times 11) - (36 \times 115)$$

$$36[116 - 115] = 36$$

The difference is same as mention in question so option (c) is correct.

473. Pepsi and coke, there are two companies, selling the packs of cold-drinks for the same selling price. Pepsi gives two successive discounts of 10% and 25%, while coke sells it by giving two successive discounts of 15% and 20%. What is the ratio of their marked price?

- (a) 143:144 (b) 19:11
(c) 136:135 (d) 73:77

Sol. (c) Let the marked price of pepsi and coke is x and y respectively. According to the question,

$$x \times \frac{90}{100} \times \frac{75}{100} = y \times \frac{85}{100} \times \frac{80}{100}$$

$$\frac{x}{y} = \frac{85 \times 80}{90 \times 75} = \frac{136}{135}$$

$$x : y = 136:135$$

474. When a shopkeeper reduces the selling price from ₹ 1080 to ₹ 1026, his loss increases by 4%. What is the selling price of this same article when it fetches a profit of 4%?

- (a) ₹ 1392 (b) ₹ 1404
(c) ₹ 1450 (d) ₹ 1350

Sol. (b) According to the question,
 4% of CP = (1080 - 1026)
 4% of CP = 54

$$1\% \text{ of CP} = \frac{54}{4}$$

$$CP = \frac{54}{4} \times 100 = ₹ 1350$$

at the profit of 4%

$$SP = \frac{1350 \times 104}{100} = ₹ 1404$$

Alternate → Note → Try to write all the statements in one line to save your valuable time

$$SP = \frac{(1080 - 1026)}{4} \times 104$$

$$= \frac{54}{4} \times 104$$

$$= ₹ 1404$$

475. A company instead of raising the mark-up by 20% discounted the cost price by 20% while stitching the price tag on its product. Further the company offers a discount of 6.25% to its customer.

In this process company incurs a loss of ₹ 37.5 on a single article. What is the selling price of that article?

- (a) 417.5 (b) 112.5
(c) 365.5 (d) None of these

Sol. (b) Let the cost price = 100 units
 According to the question,



$$25 \text{ units} = ₹ 37.5$$

$$1 \text{ units} = \frac{37.5}{25}$$

$$75 \text{ units} = \frac{37.5}{25} \times 75 = ₹ 112.5$$

476. When an article is sold for ₹ 703 loss incurred is 25% less than the profit earned on selling it at ₹ 836. What is the selling price of the article when it earns a profit of 20%?

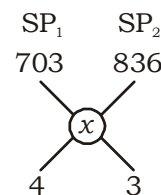
- (a) 912 (b) 1576
(c) 1532 (d) 1092

Sol. (a) Note : In such type of question try to solve the question by alligation method to save your valuable time.

$$25\% = \frac{1}{4}, \text{ profit} = 4, \text{ loss} = 3$$

Let the cost price = x

According to the question,



$$\frac{703 \times 4 + 836 \times 3}{4 + 3} = x \Rightarrow x = 760$$

$$\text{New selling price} = 760 \times \frac{120}{100}$$

$$= ₹ 912$$

Alternate:-

Note : To find the value of x quickly follow the given below method :



- (i) Divide the difference of SP_1 and SP_2 in the given ratio.

$$\begin{array}{c} (836 - 703) = \frac{133}{7} \\ \swarrow \quad \searrow \\ 4 \quad : \quad 3 \end{array}$$

$$4 \text{ units} = \frac{133}{7} \times 4 = 76$$

$$3 \text{ units} = \frac{133}{7} \times 3 = 57$$

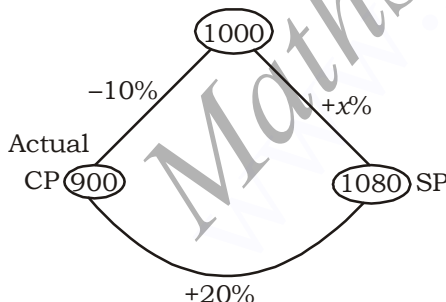
$$CP = 836 - 76 = ₹ 760$$

$$\text{New CP} = 760 \times \frac{120}{100} = ₹ 912$$

477. A balance of a trader weights 10% less than it should be. Still the trader marks up his goods to get the overall profit of 20%. What is the mark up on the cost price?

- (a) 40% above c.p.
(b) 8% above c.p.
(c) 25% above c.p.
(d) 16.66% above c.p.

- Sol.** (b) Let the Cp of 1gm weights is ₹ 1
According to the question
But he weights 900 gm for every 1000 gm



$$x\% = \left(\frac{1080 - 1000}{1000} \right) \times 100$$

$$= 8\% \text{ above c.p.}$$

$$\text{Thus, the markup value} = 8\%$$

478. A bookseller purchases 40 books for ₹ 3200 and sells them at a profit equal to the selling price of 8 books. What is the selling price of one dozen books, if the price of each book is same?

- (a) 720 (b) 960
(c) 1200 (d) 1440

- Sol.** (c) Given : CP of 40 books = ₹ 3200

According to the question,

$$SP \text{ of } 40 \text{ books} = CP \text{ of } 40 \text{ books} + SP \text{ of } 8 \text{ books}$$

$$[\therefore CP \text{ of } 40 \text{ books} = 3200]$$

$$SP \text{ of } 1 \text{ book} = ₹ 100$$

$$SP \text{ of } 1 \text{ dozen books} = ₹ 1200$$

479. Each A and B sold their articles at ₹ 1818 but A incurred a loss of 10% while B gained 1%. What is the ratio of cost price of the articles of A to that of B?

- (a) 101 : 90 (b) 85 : 89
(c) 81 : 75 (d) None of these

- Sol.** (a) According to the question,

$$\text{Cost price of A} = \frac{1818}{90} \times 100$$

$$\text{Cost price of B} = \frac{1818}{101} \times 100$$

Ratio of cost price of A and B

$$= \frac{1818 \times 101}{90 \times 1818} = 101 : 90$$

$$\text{Alternate} = 10\% = \frac{1}{10}, 1\% = \frac{1}{100}$$

CP **SP**

$$A - 10_{\times 101} \quad 9_{\times 101}$$

$$B - 100_{\times 9} \quad 101_{\times 9}$$

Note - SP is equal

$$\therefore \frac{CP \text{ of A}}{CP \text{ of B}} = \frac{1010}{900} = \frac{101}{90}$$

$$= 101 : 90$$

480. Even after a discount of q% on marked price a trader gains P%. What is the markup percentage over the cost price?

$$(a) \frac{p+q}{(q-p)} \times 100$$

$$(b) \frac{p+q}{(100-p)} \times 100$$

$$(c) \frac{p+q}{(100-q)} \times 100$$

$$(d) \text{Not possible}$$

- Sol.** (c) Note → We have discussed earlier how to write the direct relation between C.P. and M.P.

$$\begin{array}{ccc} \text{C.P.} & : & \text{M.P.} \\ (100 - q) & : & (100 + P) \end{array}$$

+ (p+q)

% Markup value

$$= \frac{(p+q)}{(100-q)} \times 100$$

Note:- In such type of questions we can assume any value of P and q and then satisfy the option to get answer.

481. A person sold an electronic watch at ₹ 96 in such a way that his percentage profit is same as the cost price of the watch. If he sells it at twice the percentage profit of its previous percentage profit then the new selling price will be

- (a) ₹ 132 (b) ₹ 150
(c) ₹ 192 (d) ₹ 180

- Sol.** (a) Let the cost price of the watch ₹ x
According to the question

$$\Rightarrow x + \frac{x \times x}{100} = 96$$

$$[\therefore SP = 96 \text{ (given)}]$$

$$\Rightarrow \frac{x^2}{100} = 96 - x$$

$$\Rightarrow x^2 = 9600 - 100x$$

$$\Rightarrow x^2 + 100x - 9600 = 0$$

$$\text{After solving } x = 60$$

$$\therefore \text{New selling price}$$

$$= 60 + \frac{60 \times 120}{100} = ₹ 132$$

482. Seema saves ₹ 25 by getting 6.66% discount on a textbook. What is the amount of money (in ₹) paid by her?

- (a) 450 (b) 350
(c) 225 (d) 375

- Sol.** (b) $6.66\% = 6\frac{2}{3}\% = \frac{1}{15}$

$$\begin{array}{ccc} \text{Discount} & : & \text{MP} \\ 1 & & 15 \end{array}$$

$$\downarrow \times 25 \quad \downarrow \times 25$$

$$25 \quad 375$$

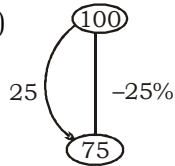
$$\text{Money paid by Seema} = 375 - 25 = ₹ 350$$



483. Due to reduction of 25% in price of oranges a customer can purchase 4 oranges more for ₹ 16. What is original price of an orange?

- (a) ₹ 1 (b) ₹ 1.33
(c) ₹ 1.5 (d) ₹ 1.6

Sol. (b)



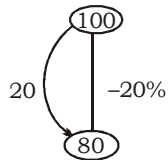
$$\% \text{ Reduction} = \frac{25}{75} = \frac{1}{3} \Rightarrow \frac{4 \rightarrow \text{new}}{3 \rightarrow \text{old}}$$

$$\text{original price} = \frac{16}{4 \times 3} = ₹ 1.33$$

484. A reduction of 20% in the price of Sugar enables a housewife to purchase 6 kg more for ₹ 240. What is the original price per kg of sugar?

- (a) ₹ 10 per kg (b) ₹ 8 per kg
(c) ₹ 6 per kg (d) ₹ 5 per kg

Sol. (a)



% Reduction =

$$\frac{20}{80} = \frac{1}{4} = \frac{5 \rightarrow \text{new}}{4 \rightarrow \text{old}}$$

$$\text{original price} = \frac{240}{4 \times 6} = ₹ 10/\text{kg}$$

485. I asked the shopkeeper the price of wrist watch. I found that I had just the required sum of money. When the shopkeeper allowed me a discount of 25%, I could buy another watch worth ₹ 940 for my younger sister. What is the price which I have paid for my own watch?

- (a) ₹ 2700 (b) ₹ 1800
(c) ₹ 2820 (d) ₹ 3760

Sol. (c) Let the marked price of my watch = 100 units

$$\text{Discount} = \frac{100 \times 25}{100} = 25 \text{ units}$$

$$\text{Remaining amount paid by me} = 100 - 25 = 75 \text{ units}$$

$$25 \text{ units} = ₹ 940$$

$$1 \text{ unit} = ₹ \frac{940}{25}$$

$$75 \text{ units} = ₹ \frac{940}{25} \times 75 = ₹ 2820$$

Alternate:-

(→) Note → To save your valuable time we can take help from options and then satisfy the question condition.

option (c)

$$\rightarrow \text{Total cost price} = 940 + 2820 = ₹ 3760$$

$$\text{Discount} = \frac{3760 \times 25}{100} = ₹ 940$$

Now the value is same as mention in question condition. So option (c) is correct.

486. A shopkeeper bought two watches for ₹ 1950 and sold one at 20% profit while other at 25% loss if the selling price of both watches is equal then find the cost price of each watch.

- (a) 750, 1200 (b) 950, 1000
(c) 752, 1225 (d) 450, 1500

Sol. (a) Let the cost of first watch be C_1 and that of second be C_2 . Then by equation

$$\frac{6}{5}C_1 = \frac{3}{4}C_2$$

$$\frac{C_1}{C_2} = \frac{3}{4} \times \frac{5}{6}$$

$$\frac{C_1}{C_2} = \frac{5}{8}$$

$$\Rightarrow C_1 : C_2 = 5 : 8$$

$$\Rightarrow C_1 = \frac{5}{13} \times 1950 = 750$$

$$\Rightarrow C_2 = \frac{8}{13} \times 1950 = 1200$$

487. A company sold the radio produced by it to the whole seller at 20% profit. Whole seller sold it to the retailer at 10% profit and the retailer sold it to a customer at 25% loss. If the customer has paid 2475 rupees for it, then find the production cost of the radio.

- (a) 2,000 (b) 3,000
(c) 2,450 (d) 2,500

Sol. Let the production cost of the radio be x . Then according to the question:

$$x \times \left(\frac{6}{5}\right) \times \left(\frac{11}{10}\right) \times \left(\frac{3}{4}\right) = 2475$$

$$\Rightarrow x = ₹ 2500$$

488. A person sold three cows for ₹ 8000, ₹ 12,000 and 6000 respectively on first cow he made a profit of 25% and on second he made 20% profit. If he made an overall profit of 30% then find the cost price of 3rd cow.

- (a) 3800 (b) 3850
(c) 3700 (d) 3600

Sol. (d) Selling price of all three cows = 8000 + 12000 + 6000 = 26,000
Since he has made 30% profit on overall transaction.

So, the cost price if all three cows

$$= \frac{10}{13} \times 26,000 = 20,000$$

While the cost price of first cow

$$= \frac{4}{5} \times 8,000 = 6400$$

Cost price of Second cow

$$= \frac{5}{6} \times 12,000 = 10,000$$

Hence, cost of third cow

$$= [20000 - (10,000 + 6400)] = 3600$$

489. A cow was sold at 8% profit. If it was bought at 20% less and sold at 40% profit, he owner would have got ₹ 640 more. Find the initial cost price of the cow ?

- (a) ₹ 15,000 (b) ₹ 16,000
(c) ₹ 20,000 (d) ₹ 25,000



$$\begin{array}{ccccc}
 \text{CP} & & \text{MRP} & & \text{SP} \\
 100 & \xrightarrow{+50\%} & 150 & \xrightarrow{+15\%} & 127.5 \\
 & & \searrow & \nearrow & \\
 & & 27.5 \text{ units} & & \\
 27.5 \text{ units} & \rightarrow & 165 & & \\
 150 \text{ units} & \rightarrow & \frac{150}{27.5} \times 165 & &
 \end{array}$$

Sol. (b) Let the initial cost price of cow be 100 units.

$$\begin{array}{ccc}
 \text{CP} & & \text{SP} \\
 100 & \longrightarrow & 108 \\
 \downarrow -20\% & & \uparrow +40\% \\
 80 & \longrightarrow & 112
 \end{array}$$

+4 units But

$$4 \text{ units} = ₹ 640$$

$$1 \text{ unit} = ₹ 160$$

$$100 \text{ units} = ₹ 16,000$$

Hence, the cost price of cow
= ₹ 16,000

490. When a cow is sold for ₹ 15,000 there is a loss to the seller. When the cow is sold for ₹ 18,000 there is a profit which is 20% of the loss, find the cost of cow.

(a) ₹ 17,000 (b) ₹ 20,000

(c) ₹ 17,500 (d) ₹ 19,000

Sol. (c) Let profit made on cow is x and the loss be y rupees then.

$$15000 + y = 18000 - x$$

$$15000 + y = 18000 - x$$

$$15000 + y = 18000 - \frac{1}{5}y$$

$$\left[\because x = \frac{20}{100} \times y \right]$$

$$\frac{6}{5}y = 3000$$

$$y = 2500$$

$$\text{Hence, the cost of the cow} = 15000 + 2500 = ₹ 17,500$$

491. A book seller marked the price at 50% higher than price of a book. He gives a discount of 15% on the marked price. In this way he got a profit of ₹ 165, find the marked price of the book ?

(a) ₹ 100 (b) ₹ 800

(c) ₹ 750 (d) ₹ 900

Sol. (d) Let CP be 100 units

MRP of the book = ₹ 900

492. Cost price of 1 kg tea and 4 kg coffee is ₹ 300 if the tea was sold at 20% profit and coffee at 10% profit than there is a net profit of ₹ 34. Find the cost of tea and coffee per kg.

(a) ₹ 50, ₹ 80

(b) ₹ 40, ₹ 55

(c) ₹ 40, ₹ 60

(d) ₹ 40, ₹ 65

Sol. (d) Let cost of 1 kg tea be $100x$ and cost of 1 kg coffee be $100y$

Then,

$$100x + 4 \times 100y = 300$$

$$100x + 400y = 300 \quad \dots (i)$$

By (II) Condition

$$20x + 40y = 34$$

Multiplying by 5 in both sides

$$\Rightarrow 100x + 200y = 170 \quad \dots (ii)$$

Subtraction (ii) from (i), We get

$$200y = 130$$

$$\text{Cost of 1 kg coffee} = 100y = ₹ 65$$

By (i)

$$100x + 260 = 300$$

$$\text{Cost of 1 kg tea } 100x = ₹ 40$$

493. A shopkeeper sold a pen for ₹ 39, he got the same profit percentage as its price was. Find the cost of the pen.

(a) ₹ 20 (b) ₹ 28

(c) ₹ 35 (d) ₹ 30

Sol. (d) Let the price of pen = ₹ x

Then Profit percentage = ₹ $x\%$

$$\text{Hence S.P.} = x \times \left(\frac{100+x}{100} \right)$$

$$x \times \left(\frac{100+x}{100} \right) = 39$$

$$100x + x^2 = 3900$$

$$\Rightarrow x^2 + 100x - 3900 = 0$$

$$\Rightarrow x^2 + 130x - 30x - 3900 = 0$$

$$\Rightarrow (x + 130)(x - 30) = 0$$

$$\Rightarrow x = 30, \text{ and } x \neq -130$$

the value of x never $-ve$

Hence cost price of pen = ₹ 30

Alternatively:-

This type of question can be handle just simply going through option taking option (d)

The C.P = 30

Profit Percentage = 30%

$$\text{Selling price} = 30 \times \frac{130}{100} = 39$$

Hence option (d) is correct answer

494. A man bought 5 cows and 13 buffalo for ₹ 51,000. He sold cows at 15% profit and buffalos at 10% loss. In this way he got a profit of ₹ 1150. Find the cost price of 2 cows and 3 buffaloss

(a) ₹ 18,000 (b) ₹ 17,500

(c) ₹ 15,000 (d) ₹ 16,000

Sol. (d) Let the price of one cow be $100x$ that of a buffalo be $100y$ then by question

$$5 \times 100x + 13 \times 100y = 51000$$

or

$$500x + 1300y = 51000 \quad \dots (i)$$

Again by question

$$\frac{15}{100} \times 500x - \frac{10}{100} \times 1300y = 1150$$

$$75x - 130y = 1150 \quad \dots (ii)$$

Multiply by 10 in (ii) and adding in (i), we get,

$$\begin{array}{r}
 500x + 1300y = 51000 \\
 750x + 1300y = 11500 \\
 \hline
 1250x = 62500 \\
 x = 50
 \end{array}$$

$$\Rightarrow \text{Price of cow } 100x = ₹ 5000$$

By (i)

$$1300y = 26000$$



$$100y = ₹ 2000$$

$$\text{Price of buffalo} = ₹ 2000$$

$$\text{Price of 2 cows and 3 buffalos}$$

$$= 2 \times 5000 + 3 \times 2000 = 16000$$

495. Two different type of watches were bought for ₹ 3360. One was sold at 12% loss and other at 12% profit and there was no loss and no profit during whole transaction. Find the cost price of each watch.

$$(a) ₹ 1600, ₹ 1760$$

$$(b) ₹ 1800, ₹ 1560$$

$$(c) ₹ 1680, ₹ 1680$$

$$(d) \text{None of these}$$

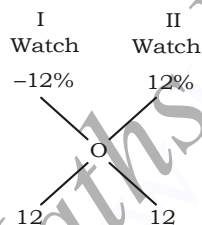
- Sol.** (c) Let cost price of first and second watch be x and y . Since there is no profit and no loss during the transaction hence the loss incurred at the first is equal to profit made at second.

$$\text{i.e., } \frac{12}{100} \times x = \frac{12}{100} \times y \Rightarrow x = y$$

$$\text{Hence price of each watch}$$

$$= \frac{3360}{2} = ₹ 1680$$

Alternate:-



$$\text{Ratio of C.P.} \rightarrow 1 \quad 1$$

$$\text{Cost price of each watch} = \frac{1}{2} \times 3360 = 1680$$

496. If I sell a horse for ₹ 6200 and a cow for ₹ 2600 then I get 10% profit on the cost of both. If I sell the horse for ₹ 6000 and the cow at its cost price then I get a profit of $12\frac{1}{2}\%$ find the cost price of the horse and the cow.

$$(a) ₹ 4500, ₹ 3500$$

$$(b) ₹ 4000, ₹ 4000$$

$$(c) ₹ 5000, ₹ 3000$$

$$(d) ₹ 5500, ₹ 2500$$

- Sol.** (c) Let the cost price of horse and the cow be x and y respectively

(Ist) Condition:- There is a profit of 10% on the whole cost.

$$\Rightarrow x + y = \frac{10}{11} \times (6200 + 2600)$$

$$x + y = \frac{10}{11} \times 8800 = ₹ 8000$$

(IInd) Condition: There is a profit

of $12\frac{1}{2}\%$ on the whole cost.

$$\Rightarrow 6000 + y = \frac{9}{8} \times 8000$$

$$6000 + y = 9000$$

$$y = ₹ 3000$$

$$\text{and } x = ₹ 5000$$

497. A person bought a pen and a book. He sold book at 10% loss and pen at 20% profit making no profit no loss during the whole transaction. If he sells the book at 5% profit and pen at 20% profit he will get a profit of ₹ 60. Find the cost of both the book and the pen.

$$(a) ₹ 200, ₹ 400 \quad (b) ₹ 300, ₹ 250$$

$$(c) ₹ 250, ₹ 300 \quad (d) ₹ 400, ₹ 200$$

- Sol.** (d) Let the price of pen and book be x and y respectively. Since there is no loss no profit, so the loss at book must be equal to the profit at pen.

$$\Rightarrow \frac{1}{10}y = \frac{1}{5}x$$

$$\frac{x}{y} = \frac{1}{2} \quad (\text{or } 2x = y)$$

$$x : y = 1 : 2$$

by second condition

$$\frac{21}{20}y + \frac{6}{5}x = (x + y + 60)$$

$$\frac{21}{20} \times 2x + \frac{6}{5}x = x + 2x + 60$$

$$\frac{21}{10}x + \frac{6}{5}x = 3x + 60$$

$$\frac{33}{10}x - 3x = 60$$

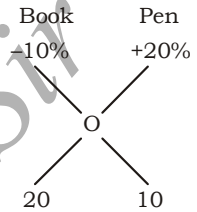
$$\frac{3x}{10} = 60$$

$$\text{Price of pen } x = 200$$

$$\text{Price of book} = 2x = 400$$

Alternate:-

Using alligation



$$\text{Ratio of C.P.} \rightarrow 2 : 1$$

$$\text{Let the C.P of Books} = 200 \text{ units}$$

Now,

$$\left(200 \times \frac{5}{100} + \frac{100 \times 20}{100} \right) \text{ unit} = 60$$

$$(10 + 20) \text{ unit} = 60$$

$$30 \text{ unit} = 60$$

$$1 \text{ unit} = 2$$

$$\text{C.P of Book} = 200 \text{ units}$$

$$= 200 \times 2 = 400$$

$$\text{C.P of Pens} = 100 \text{ unit}$$

$$= 100 \times 2 = 200$$

498. A trader sold 90 quintals wheat at 8% profit and 50 quintal wheat at 10% profit. Had he sold all the wheat at 9% profit he would have earned ₹ 120 more. Find per quintal price of wheat-

$$(a) ₹ 250 \quad (b) ₹ 300$$

$$(c) ₹ 350 \quad (d) ₹ 400$$

- Sol.** (b) Let the per quintal price of wheat be 100%

then profit earned in first condition

$$= 90 \times 8\% + 50 \times 10\%$$

$$= 720\% + 500\% = 1220\%$$

Profit earned in second condition.

$$= 140 \times 9\% = 1260\%$$

But the profit in second condition is ₹ 120 more So.

$$1260\% = 1220\% + 120$$

$$40\% = 120$$

$$1\% = 3$$

$$100\% = 300$$

Hence price of wheat per quintal is ₹ 300



499. A man announces 25% discount on the marked price of a bicycle and still makes a profit of 20%. If he had bought it for ₹ 1200. Find the marked price of bi-cycle –
- (a) ₹ 1500 (b) ₹ 1920
(c) ₹ 2000 (d) ₹ 1800

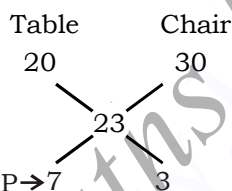
Sol. (b) Use the following relation in such type of question.

C.P	:	M.R.P.
(100 – discount)	:	(100 + Profit/Loss)
(100 – 25)	:	(100 + 20)
75	:	120
↓ ×16		↓ ×16
1200		1920

Hence the marked price of bicycle is 1920.

500. A man bought a table and a chair for ₹ 2000. He sold table at 20% profit and chair at 30% profit in this way he makes a profit of 23% on the whole transaction. Find the cost price of table.
- (a) ₹ 1500 (b) ₹ 600
(c) ₹ 1400 (d) ₹ 1250

Sol.



$$10 \text{ unit} = 2000$$

$$1 \text{ unit} = 200$$

$$\text{C.P of table} = 7 \times 200 = 1400$$

501. A machine when was sold at 1230 the seller incurred a loss of 18%. If he wants to make a profit of $6\frac{1}{4}\%$ at what rate he must sell the machine?
- (a) ₹ 1600 (b) ₹ 1593.76
(c) ₹ 1590 (d) ₹ 1650

Sol. (b) Required Amount

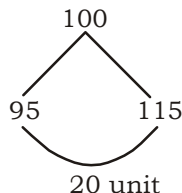
$$= \frac{\left(100 + 6\frac{1}{4}\right)}{(100 - 18)} \times 1230$$

$$= \frac{425}{4 \times 82} \times 1230 = ₹ 1593.75$$

502. A cow was sold at 15% profit. If it was sold for ₹ 1200 less the seller incurred a loss of 5%. If he want to make a profit of $12\frac{1}{2}\%$ at what rate he must sell it?

(a) ₹ 7000 (b) ₹ 9000
(c) ₹ 6000 (d) ₹ 7250

Sol. (c)



$$20 \text{ unit} \rightarrow 1200$$

$$1 \text{ unit} \rightarrow 60$$

$$\text{C.P} = 100 \times 60 = ₹ 6000$$

503. The list price of T.V. is ₹ 6400 and is sold to a retailer at two successive discount of 25% and 15% respectively. The retailer wants to print a price at the T.V in such a way that after allowing a discount of 10% at new marked price he can earn 20% profit. Find the new marked price ?

(a) ₹ 6000 (b) ₹ 8000
(c) ₹ 5400 (d) ₹ 5440

Sol. (d) Cost price at which the retailer bought T.V

$$= 6400 \times \frac{75}{100} \times \frac{85}{100}$$

$$= 6400 \times \frac{3}{4} \times \frac{17}{20} = 4080$$

$$\text{Hence, } \frac{9}{10} \times \text{New MRP}$$

$$= \frac{6}{5} \times 4080$$

$$\text{New MRP} = \frac{6}{5} \times \frac{10}{9} \times 4080$$

$$\Rightarrow \frac{4}{3} \times 4080 = ₹ 5440$$

Hence, the new MRP must be ₹ 5440

504. Marked price of a fridge is ₹15000. It was sold after giving two successive discount of 20% and 10%. A person who bought it spend 10% of the cost price to repair it. If he wants to make 20% profit at what rate should he sell the fridge.

(a) ₹ 14625 (b) ₹ 14265
(c) ₹ 14256 (d) ₹ 14500

Sol. The cost at which the man purchased the freeze

$$= 15000 \times \frac{80}{100} \times \frac{90}{100}$$

$$= \frac{4}{5} \times \frac{9}{10} \times 15000 = 10800$$

Since man has spend 10% to repair it

So, Required rate to earn a profit of 20%

$$= 10800 \times \frac{6}{5} \times \frac{11}{10} = 14256$$

506. A man bought some articles and spent 4% of the cost price on the transportation. But the circumstances made him sell all the articles at 5% loss. If he had sold them for ₹ 32.5 more he would have gained 2.5% profit. Find cost price of the articles.

(a) ₹ 416.66 (b) ₹ 415.66
(c) ₹ 421.66 (d) ₹ 414.66

Sol. (a) Let the C.P of the articles = x
Then total C.P. of the articles after transportation = $\frac{26}{25}x$

$$[\text{Since } = 4\% = \frac{1}{25}]$$

Hence by question

$$\left(\frac{26}{25}x\right) \times 7.5\% = 32.5$$

$$\left(\frac{26}{25}x\right) \times \frac{7.5}{100} = 32.5$$

$$x = \frac{32.5 \times 100 \times 25}{26 \times 7.5}$$

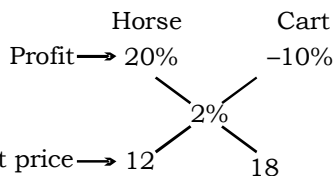
$$x = \frac{1250}{3} = 416.66$$



507. A person bought a horse and a cart for ₹ 5000. He sold horse at 20% profit while the cart at 10% loss in all he was able to make a profit of 2%. Find the difference of cost price of the horse and cart.

- (a) ₹ 0
(b) ₹ 3000
(c) ₹ 2000
(d) ₹ 1000

Sol. (d) This type of question can be done by mixture and Alligation easily—



So, the ratio of their cost
= 12 : 18
= 2 : 3

Since they both were bought for ₹ 5000. Hence, the difference of their cost price

$$= \left(\frac{3-2}{5} \right) \times 5000$$

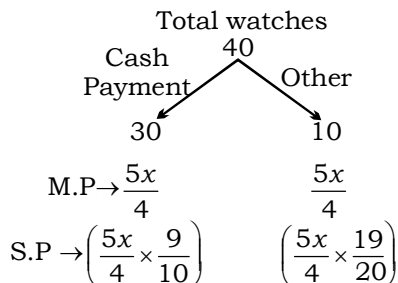
$$\Rightarrow \frac{1}{5} \times 5000 \Rightarrow 1000$$

508. A man bought 40 watches and marked a tag price above 25% of the cost price. He started to give 10% discount for the cash payment and 5% discount for others. He sold $\frac{3}{4}$ of the stock in cash payment. If he earned ₹ 2250 as a profit, find the cost of each watch.

- (a) 400
(b) 600
(c) 500
(d) 700

Sol. (a) Let the cost price of watch be ₹ x

Then,



Now total profit

$$= \text{Total S.P} - \text{Total C.P}$$

$$2250 = 30 \times \left(\frac{5x}{4} \times \frac{9}{10} \right) + 10$$

$$\times \left(\frac{5x}{4} \times \frac{19}{20} \right) - 40x$$

$$2250 = \frac{135x}{4} + \frac{95x}{8} - 40x$$

$$2250 = \frac{45x}{8} \Rightarrow x = ₹ 400$$

509. Vipin allows a discount of 25% on the advertise price and earn a profit of 20%. What should he mark the price of an article so that he may earn ₹ 1801 ?

- (a) ₹ 14480 (b) ₹ 16909
(c) ₹ 14408 (d) ₹ 16209

Sol. (c) Let the marked price of article = ₹ x

Then, selling price of the

$$\text{article} = \frac{3}{4} x$$

Also,

the cost price of the article

$$= \frac{5}{6} \times \left(\frac{3}{4} x \right)$$

Now, Profit is given by—

$$\Rightarrow \frac{3}{4} x - \frac{5}{6} \times \frac{3}{4} x = 1801$$

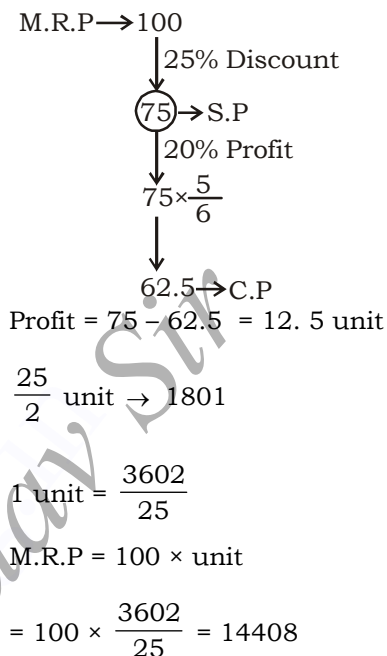
$$\Rightarrow \frac{3}{4} x - \frac{5}{8} x = 1801$$

$$\Rightarrow \frac{1}{8} x = 1801$$

$$x = 14408$$

Hence the marked price of the article = ₹ 14408 .

Alternate:-



510. A trader bought a radio and spent 10% on transportation. If after giving a discount of 10% he wants to make a profit of 10% find what percent above the cost price has he marked the price of the radio?

- (a) $33\frac{1}{3}\%$
(b) $34\frac{4}{9}\%$
(c) $34\frac{5}{9}\%$
(d) None of these

Sol. (b) Let the cost price be 100 units

Then,

Initial Price	Total price	S.P
100	110	121 units

Now, since he given a discounts of 10% so let the marked price be x

Then,

$$\frac{9}{10} \times x = 121$$

$$x = \frac{1210}{9}$$

$$x = 134\frac{4}{9} \text{ units}$$



So,

Required percentage

$$= \frac{134\frac{4}{9} - 100}{100} \times 100 = 34\frac{4}{9}\%$$

511. A shopkeeper bought 20 T.V. sets for ₹ 5000 per T.V. and also paid a tax at the rate of 10% and spent 5% for the transportation. He wants to mark the price of each T.V. in such a way that after allowing a discount of 25% he may earn 20% profit. Find the marked price of each T.V.

- (a) ₹ 10200 (b) ₹ 9200
(c) ₹ 9900 (d) ₹ 9222

Sol. (b) Let the marked price be ₹ x . Then

$$\begin{array}{ccccc} \text{C.P.} & & \text{Total Price} & & \text{S.P.} \\ 5000 & \xrightarrow{+15\%} & 5750 & \xrightarrow{+20\%} & 6900 \end{array}$$

By question,

$$\frac{3}{4} \times x = 6900$$

$$x = \frac{4}{3} \times 6900 = ₹ 9200$$

512. A man wanted to sell an article with 20 % profit; but he actually sold at 20 % loss for Rs. 480. At what price he wanted to sell it to earn the profit?

- (a) Rs. 720 (b) Rs. 840
(c) Rs. 600 (d) Rs. 750

Sol. (a) $\therefore 20\% \text{ loss} = \frac{1}{5} \rightarrow \text{loss}$
 $\frac{1}{5} \rightarrow \text{c.p.}$

$$\Rightarrow \text{Sp} = 5 - 1 = 4$$

$$\begin{array}{ccc} \text{C.P.} & : & \text{S.P.} \\ 5 & : & 4 \\ \downarrow \times 120 & & \downarrow \times 120 \\ 600 & & 480 \end{array}$$

i.e. c.p. = 600

now,

$$\text{for } 20\% \text{ profit} = \frac{1}{5} \rightarrow \text{loss}$$

$$\frac{1}{5} \rightarrow \text{c.p.}$$

$$\Rightarrow \text{SP} = 5 + 1 = 6$$

$$\begin{array}{ccc} \text{C.P.} & : & \text{S.P.} \\ 5 & : & 6 \\ \downarrow \times 120 & & \downarrow \times 120 \\ 600 & & 720 \end{array}$$

i.e. original S.P. = Rs. 720

513. A person sells two machines at Rs. 396 each. On one he gains 10 % and on the other he loses 10 %. His profit or loss in the whole transaction is:

- (a) no gain no loss (b) 1 % loss
(c) 1 % profit (d) 8 % profit

Sol. (b) Here, the S.P. is same for both the machines. Hence, there will always be a loss in this situation.

$$\therefore \text{Required loss} = \frac{x^2}{100} = \frac{10^2}{100} = 1\%$$

514. A house worth Rs. 1,50,000 is sold by X at a 5 % profit to Y, Y sells the house back to X at a 2% loss. Then in the entire transaction?

- (a) X gains Rs. 4,350
(b) X loses Rs. 4,350
(c) X gains Rs. 3,150
(d) X loses Rs. 3,150

Sol. (c) Cost price of house for Y
= 105 % of 150000 = Rs. 157500
S.P. of house for Y
= 98 % of 157500 = Rs. 154350
 $\therefore$ Gain for X = Rs. (157500 - 154350) = Rs. 3150

515. A book-seller bought 200 textbooks for Rs.12,000. He wanted to sell them at a profit so that he got 20 books free. At what profit percent should he sell them?

- (a) 10 (b) 11
(c) 11.5 (d) 12

Sol. (a) CP of a book = $\frac{12000}{200}$ = Rs. 60

$$\therefore \text{Total profit} = \text{Rs. } 60 \times 20 = \text{Rs. } 1200$$

$$\therefore \text{profit \%} = \frac{1200}{12000} \times 100 = 10\%$$

516. If the sales tax be reduced from

$3\frac{1}{2}\%$ to $3\frac{1}{3}\%$, what difference

does it make to person who purchases an article whose marked price is Rs. 8,400 ?

- (a) Rs. 20 (b) Rs. 15
(c) Rs. 14 (d) Rs. 10

Sol. (c) Difference in percentage of sales tax

$$= \frac{7}{2} - \frac{10}{3} = \frac{21 - 20}{6} = \frac{1}{6}\%$$

= Required difference = Rs

$$\left(\frac{1}{6}\% \text{ of } 8400\right)$$

$$= \text{Rs. } \left(\frac{1}{6} \times \frac{1}{100} \times 8400\right)$$

$$= \text{Rs. } 14$$

517. The price of coal is increased by 20 %. By what percent a family should decrease its consumption so that expenditure remains same ?

- (a) 40 % (b) $23\frac{1}{3}\%$
(c) 20 % (d) $16\frac{2}{3}\%$

Sol. (d) Required % decrease

$$= \frac{20}{100 + 20} \times 100 = \frac{20}{120} \times 100$$

$$= \frac{1}{6} \times 100 = 16\frac{2}{3}\%$$

518. If an article is sold at 5 % gain instead of 5 % loss, the man gains Rs. 5 more. Find the cost price of that article:

- (a) Rs. 100 (b) Rs. 144
(c) Rs. 50 (d) Rs. 110

Sol. (c) Difference in % = 5 - (-5) = 10

$$\therefore 10\% \cong 5$$

$$\Rightarrow 100\% \cong 50$$

i.e. c.p. of the article Rs. 50

519. Joseph's salary is reduced by 10 %. In order to have his salary back to his original amount, it must be raised by :

- (a) 12.5 % (b) $11\frac{1}{9}\%$
(c) 10 % (d) 11 %



Sol. (b) Required percentage increase

$$= \frac{10}{100 - 10} \times 100 = \frac{1}{9} \times 100 = 11\frac{1}{9}\%$$

520. A person sells an article for Rs. 75 and gains as much per cent as the cost price of the article is:

- (a) Rs. 37.50 (b) Rs. 40
(c) Rs. 50 (d) Rs. 150

Sol. (c) Let the cost price be Rs. x

$$\therefore \text{Gain \%} = x\%$$

$$\Rightarrow \frac{\text{S.P.} - \text{C.P.}}{\text{CP}} \times 100 = x$$

$$\Rightarrow \frac{75 - x}{x} \times 100 = x$$

$$\Rightarrow x^2 + 100x - 7500 = 0$$

$$\Rightarrow (x + 150)(x - 50) = 0$$

$$\Rightarrow x = 50$$

Alternatively :-

Go through options

option (b) - CP = 40

$$\therefore \text{S.P.} = 40 + 40\% \text{ of } 40 \\ = 56 \neq 75$$

Option (c) - CP = 50

$$\therefore \text{S.P.} = 50 + 50\% \text{ of } 50 \\ = 50 + 25 = 75$$

i.e. option (c) is correct.

521. A man gains 20 % by selling an article for a certain price. If he sells it at double the price, the percentage of profit will be :

- (a) 40 (b) 140
(c) 100 (d) 120

Sol. (b) Gain % = 20 % = $\frac{1}{5} \rightarrow$ Gain

$$\Rightarrow \text{S.P.} = 5 + 1 = 6$$

$$\therefore \text{new S.P.} = 6 \times 2 = 12$$

$$\therefore \text{Gain \%} = \frac{12 - 5}{5} \times 100$$

$$= \frac{7}{5} \times 100 = 140\%$$

522. A shopkeeper gains 20 % while buying the goods and 30 % while selling them. Find his total gain per cent :

- (a) 50 % (b) 36 %
(c) 56 % (d) 40 %

Sol. (c) For two consecutive gains of $x\%$ and $y\%$

$$\text{Effective gain} = \left(x + y + \frac{xy}{100} \right)\%$$

His total gain %

$$= \left(20 + 30 + \frac{20 \times 30}{100} \right) = 56\%$$

Alternatively:-

$$100 \xrightarrow{+20\%} 120 \xrightarrow{+30\%} 156$$

$$\text{i.e. total gain \%} = 56\%$$

523. A saleable article passes successively in the hands of three traders. Each trader sold it further at a gain of 25 % of the cost price. If the last trader sold it for Rs. 250 then what was the cost price for the first trader?

- (a) Rs. 128 (b) Rs. 150
(c) Rs. 192 (d) Rs. 200

Sol. (a) Let C.P. for the first trader = Rs. x

$$\therefore x \times \frac{125}{100} \times \frac{125}{100} \times \frac{125}{100} = 250$$

$$\Rightarrow x = \text{Rs. } 128$$

Alternatively:-

$$\therefore 25\% = \frac{1}{4}$$

and the process is repeated 3 times

$\therefore$ let C.P. for the 1st trader

$$= (4)^3 = 64$$

$$\begin{array}{ccccccc} 64 & \xrightarrow{+25\%} & 80 & \xrightarrow{+25\%} & 100 & \xrightarrow{+25\%} & 125 \\ \text{1st trader} & & \text{1st trader} & & \text{3rd trader} & & \text{S.P. for} \\ \text{C.P.} & & \text{C.P.} & & \text{C.P.} & & \text{3rd trader} \end{array}$$

$$\text{i.e. } 125 \cong 250$$

$$\therefore 64 \cong \frac{250}{125} \times 64 = 128$$

i.e. c.p. for the 1st trader

$$= \text{Rs. } 128$$

524. Nikita bought 30 kg of wheat at the rate of Rs. 9.50 per kg and 40 kg of wheat at the rate of Rs. 8.50 per kg and mixed them. She sold the mixture at the rate of Rs. 8.90 per kg. Her total profit or loss in the transaction was :

- (a) Rs. 2 loss (b) Rs. 2 profit
(c) Rs. 7 loss (d) Rs. 7 profit

Sol. (a) Total C.P. of 70 kg of wheat
= Rs. $(30 \times 9.5 + 40 \times 8.5)$
= Rs. 625.

$$\text{Total S.P. of 70 kg of wheat} \\ = \text{Rs. } (8.90 \times 70) = \text{Rs. } 623$$

$$\therefore \text{loss} = \text{Rs. } (625 - 623) = \text{Rs. } 2$$

525. An article passing through two hands is sold at a profit of 38 % at the original cost price. If the first dealer makes a profit of 20 %, then the profit per cent made by the second is:

- (a) 15 (b) 12
(c) 10 (d) 5

Sol. (a) Let C.P. of the article = Rs. 100

After passing through two hands, price of the article = Rs. 138

and C.P. for the 2nd dealer = Rs. $(100 + 20\% \text{ of } 100) = \text{Rs. } 120$

[As first dealer makes a profit of 20 %]

S.P. for the 2nd dealer = Rs. 138

$\therefore$ profit % made by the second

$$= \frac{138 - 120}{120} \times 100$$

$$= \frac{18}{120} \times 100 = 15\%$$

526. If a manufacturer gains 10 per cent, wholeseller 15 percent and retailer 25 percent, then the production cost of an article, whose retail price is Rs. 1,265, is :

- (a) Rs. 700 (b) Rs. 750
(c) Rs. 800 (d) Rs. 900



Sol. (c) $10\% = \frac{1}{10}$, 15%

$= \frac{3}{20}$, $25\% = \frac{1}{4}$

Let production cost = $10 \times \text{L.C.M}$
of 10, 20, 4 = 200

$$\begin{array}{ccccccc} 200 & \xrightarrow{+10\%} & 220 & \xrightarrow{+15\%} & 253 & \xrightarrow{+25\%} & 316.25 \\ \text{Manufacturer} & & \text{wholesaler} & & \text{Retailer} & & \\ \text{c.p.} & & \text{c.p.} & & \text{c.p.} & & \end{array}$$

i.e. $316.25 \approx 1265$

$\therefore 200 \text{ units}$

$\approx \frac{1265}{316.25} \times 200 = \text{Rs. } 800$

i.e. production cost = Rs. 800

527. Partha earns 15 per cent on an investment but loses 10 per cent on another investment. If the ratio of two investments is 3 : 5, then the combined loss percent is :

- (a) $\frac{5}{4}$ (b) $\frac{4}{5}$
(c) $\frac{8}{5}$ (d) $\frac{5}{8}$

Sol. (d) By Alligation Rule

1st investment 2nd investment
+ 15% - 10%

$$\begin{array}{ccc} & & x \\ & \swarrow & \searrow \\ x-10 & & 15-x \\ 3 & : & 5 \end{array}$$

$\therefore \frac{x-10}{15-x} = \frac{3}{5}$

$\Rightarrow 5x - 50 = 45 - 3x$

$\Rightarrow 8x = -5$

$\Rightarrow x = -\frac{5}{8}$

i.e. loss % = $x\% = \frac{5}{8}\%$

528. A tradesman by means of a false balance defrauds 10 per cent in buying goods and also defrauds 10 percent in selling. His gain percent is :

- (a) 10 (b) 11
(c) 21 (d) 100

Sol. (c) Required gain %

$= \left(x + y + \frac{xy}{100} \right) \%$

$= \left(10 + 10 + \frac{10 \times 10}{100} \right) \% = 21 \%$

529. If the cost of pins reduces by Rs. 4 per dozen, 12 more pins can be purchased for Rs. 48. The cost of pins per dozen after reduction is:

- (a) Rs. 8 (b) Rs. 12
(c) Rs. 16 (d) Rs. 20

Sol. (b) Let the original price = Rs x
per dozen

$\therefore$ new price = Rs.

$(x - 4)$ per dozen

original no. of pins

$= \frac{48}{x}$ dozens

new no. of pins = $\frac{48}{x-4}$ dozens

According to the question,

$\frac{48}{x-4} - \frac{48}{x} = 1$

$\Rightarrow x(x-4) = 48 \times 4$

$\Rightarrow x^2 - 4x - 192 = 0$

$\Rightarrow (x-16)(x+12) = 0$

$\Rightarrow x = 16$, because the price of pins can not negative.

$\therefore$ new price = $16 - 4 = \text{Rs. } 12$
per dozen.

Alternatively:-

Go through the options.

530. A piece of land came to person through three middleman each gaining 20 %. If the person purchased the land for Rs. 3,45,600 the original cost of the land was:

- (a) Rs. 1,00,000
(b) 1,50,000
(c) Rs. 1,75,800
(d) Rs. 2,00,000

Sol. (d) Let the original cost of the land = Rs. 1000

$1000 \xrightarrow{+20\%} 1200 \xrightarrow{+20\%} 1440 \xrightarrow{+20\%} 1728$

i.e. $1728 \approx 345600$

$\therefore 1000 \approx \frac{345600}{1728} \times 1000$

$= 200000$

i.e. original cost = Rs. 200000

531. A merchant finds his profit as 20 % of the selling price. His actual profit is :

- (a) 20 % (b) 22 %
(c) 25 % (d) 30 %

Sol. (c) profit = 20 % (on s.p.)

$= \frac{1}{5} \rightarrow \text{profit}$
 $= \frac{1}{5} \rightarrow \text{s.p.}$

$\Rightarrow \text{c.p.} = 5 - 1 = 4$

$\therefore$ profit % (on c.p.)

$= \frac{1}{4} \times 100 = 25\%$

532. To gain 10 % on selling sample milk at the cost price of pure milk, the quantity of water to be mixed with 50 kg. of pure milk is :

- (a) 2.5 kg (b) 5 kg
(c) 7.5 kg (d) 10 kg.

Sol. (b) Let the quantity of water mixed be x kg

Let the c.p. of 1 kg of pure milk = Re. 1

$\therefore \text{Gain \%} = \frac{x}{50} \times 100$

$\Rightarrow 10 = 2x$

$\Rightarrow x = 5 \text{ kg.}$

533. On selling an almirah for Rs. 2576, a person got a profit of 12 %. Had it been bought for Rs. 100 less, the profit per cent would have been :

- (a) $11\frac{1}{9}$ (b) $13\frac{1}{3}$
(c) $17\frac{1}{11}$ (d) $17\frac{9}{11}$



Sol. (c) profit = 12 % = $\frac{3}{25} \rightarrow$ profit
 $\Rightarrow$ s.p. = 28

$$\therefore \begin{array}{cc} \text{C.P.} & : & \text{S.P.} \\ 25 & : & 28 \end{array}$$

$$\downarrow \times 92$$

$$2300 \quad 2576$$

i.e. c.p. of the almirah

= Rs. 2300

$$\therefore \text{new c.p.} = 2300 - 100$$

= Rs. 2200

$\therefore$ profit %

$$= \frac{2576 - 2200}{2200} \times 100$$

$$= \frac{376}{22} = \frac{188}{11} = 17 \frac{1}{11} \%$$

534. X sells two articles for 4,000 each with no loss and no gain in the interaction. If one was sold at a gain of 25 % the other is sold at a loss of :

(a) 25 % (b) $18 \frac{2}{9} \%$

(c) $16 \frac{2}{3} \%$ (d) 20 %

Sol. (c) On one article gain = 25 %

$$= \frac{1}{4} \rightarrow \text{gain}$$

$$= \frac{1}{4} \rightarrow \text{c.p.}$$

$$\Rightarrow \text{s.p.} = 5$$

$$\therefore \begin{array}{cc} \text{C.P.} & : & \text{S.P.} \\ 4 & : & 5 \end{array}$$

$$\downarrow \times 800$$

$$3200 \quad 4000$$

i.e. profit = Rs. 800 (on 1st)

$\therefore$ Loss on 2nd article = Rs. 800

$\therefore$ c.p. of second article

$$= 4000 + 800 = 4800$$

$$\therefore \text{loss \%} = \frac{800}{4800} \times 100 = 16 \frac{2}{3} \%$$

535. By selling an article for Rs. 665, there is a loss of 5 %. In order to make a profit of 12 %, the selling price of the article must be:

- (a) Rs. 812 (b) Rs. 800
 (c) Rs. 790 (d) Rs. 784

Sol. (d) loss = 5 % = $\frac{1}{20} \rightarrow$ loss

$$\Rightarrow \text{s.p.} = 20 - 1 = 19$$

$$\therefore \begin{array}{cc} \text{C.P.} & : & \text{S.P.} \\ 20 & : & 19 \end{array}$$

$$\downarrow \times 35$$

$$700 \quad 665$$

i.e. c.p. of the article = Rs 700

Now, to make profit of 12 %

$$\text{S.P.} = 700 + 12 \% \text{ of } 700$$

$$= \text{Rs. } 784$$

536. Mahesh purchased a radio at

$\frac{9}{10}$ of its selling price and sold it at 8 % more than its original selling price. His gain per cent is:

- (a) 20 % (b) 18 %
 (c) 10 % (d) 8 %

Sol. (a) let s.p. of the radio = Rs. 10

$$\therefore \text{c.p. of the radio} = \text{Rs. } 9$$

$$\text{new s.p.} = 10 + 8 \% \text{ of } 10 = 10.8$$

$\therefore$ gain

$$\% = \frac{10.8 - 9}{9} \times 100 = \frac{1.8}{9} \times 100$$

$$= 20 \%$$

537. A shopkeeper bought pens at the rate of 7 for Rs. 10 and sold them at a profit of 40 %. How many pens would a customer get for Rs. 10?

- (a) 6 (b) 4
 (c) 5 (d) 3

Sol. (c) c.p. of 7 pens = Rs. 10

$$\text{profit} = 40 \% = \frac{2}{5} \rightarrow \text{profit}$$

$$\Rightarrow \text{s.p.} = 2 + 5 = 7$$

$$\therefore \begin{array}{cc} \text{C.P.} & : & \text{S.P.} \\ 5 & : & 7 \end{array}$$

$$\downarrow \times 2$$

$$10$$

$$\downarrow \times 2$$

$$14$$

i.e. s.p. of 7 pens = Rs. 14

i.e. in 14 Rs. customer get 7 pens

$\therefore$ in 10 Rs. customer will get

$$= \frac{7}{14} \times 10 = 5 \text{ pens}$$

538. From 2008 to 2009, the sales of a book decreased by 80 %. If the sales in 2010 were the same as in 2008, by what per cent did it increase from 2009 to 2010?

- (a) 120 % (b) 400 %
 (c) 80 % (d) 100 %

Sol. (b) let no. of books sold in 2008 = 100

$\therefore$ no. of books sold in 2009

= 20 & no. of books sold in 2010

= 100

$\therefore$ Required % increase

$$= \frac{100 - 20}{20} \times 100 = 400 \%$$

539. A man purchases two fans for Rs. 2,160. By selling one fan at a profit of 15 % and the other at a loss of 9 % he neither gains nor loses in the whole transaction. Find the cost price of each fan in Rs.:

- (a) 710, 1450 (b) 1530, 630
 (c) 810, 1350 (d) 1340, 820

Sol. (c) By Alligation Rule,

$$\begin{array}{ccc} \text{Fan-I} & & \text{Fan-II} \\ + 15 \% & & - 9 \% \\ & \searrow & \swarrow \\ & 0 & \\ & \swarrow & \searrow \\ 0 - (-9) = 9 & & 15 - 0 = 15 \end{array}$$

i.e. c.p. of I-fan : c.p. of II-Fan = 9 : 15 = 3 : 5

$$\text{CP of fan I}^{\text{st}} = \frac{3}{8} \times 2160 = 810$$

$$\text{CP of fan II}^{\text{nd}} = \frac{5}{8} \times 2160 = 1350$$

540. Oranges are bought at 7 for Rs. 3. At what rate per hundred must they be sold to gain 33 %?

- (a) Rs. 56 (b) Rs. 60
 (c) Rs. 58 (d) Rs. 57



543. The cash difference between selling prices of an article at a profit of 4% and 6% is Rs.3. The ratio of the two selling prices is :

- (a) 51 : 52 (b) 52 : 53
(c) 51 : 53 (d) 52 : 55

Sol. (b) $\therefore 4\% = \frac{1}{25} \rightarrow$ c.p.

and $6\% = \frac{3}{50} \rightarrow$ c.p.

But c.p. should be same

$4\% = \frac{2}{50} \rightarrow$ profit

$\Rightarrow$ s.p. = $50 + 2 = 52$

and $6\% = \frac{3}{50} \rightarrow$ profit

$\Rightarrow$ s.p. = $50 + 3 = 53$

$\therefore$ difference = $53 - 52 = 1$

$\therefore 1 = 3$

$\therefore$ Required ratio = $52 \times 3 : 53 \times 3$
= $52 : 53$

544. The price of a jewel, passing through three hands, rises on the whole by 65%. If the first and the second sellers earned 20% and 25% profit respectively, the profit earned by the third seller is :

- (a) 20% (b) 15%
(c) 10% (d) 5%

Sol. (c) Let the price of the jewel = Rs. 100

$\therefore$ profit of the jewel, after passing through hands = Rs. 165

Rs. 100 $\xrightarrow{+20\%}$ 120 $\xrightarrow{+25\%}$ 150 $\rightarrow$ Rs. 165
(I-stseller) (II-seller) (III-seller) (Final price)

$\therefore$ profit (earned by third seller) = $165 - 150 = 15$

$\therefore$ required % = $\frac{15}{150} \times 100 = 10\%$

545. A reduction of 20% in the price of salt enabled a purchaser to obtain 4 kg. more for Rs. 100. The reduced price of salt per kg is :

- (a) Rs. 4 (b) Rs. 5
(c) Rs. 6.25 (d) Rs. 6.50

Sol (b) $20\% = \frac{1}{5}$

	Initial	Final
price	5	5 - 1 = 4
quantity	4	5
	5 - 4 = 1 kg more	

$\left[\therefore \text{price} \propto \frac{1}{\text{Quantity}} \right]$

i.e. $1 \cong 4$

$\therefore$ Initial quantity = $4 \times 4 = 16$ kg in Rs. 100

& Final quantity

= $5 \times 4 = 20$ kg in Rs. 100

$\therefore$ Reduced (or final) price of the salt per kg = $\frac{100}{20} = \text{Rs. } 5$

Alternate:-

New Price = $\frac{x\% \times \text{Rs.}}{\text{extra quantity} \times 100}$

Old price = $\frac{x\% \times \text{Rs.}}{\text{extra quantity} \times (100 \pm x\%)}$

546. A person sells a table at a profit of 10%. If he had bought the table at 5% less cost and sold for Rs. 80 more, he would have gained 20%. The cost price of the table is :

- (a) Rs. 3,200 (b) Rs. 2,500
(c) Rs. 2,000 (d) Rs. 200

Sol. (c) Let the c.p. of the table = Rs. 100

c.p. (100) $\xrightarrow{+10\%}$ (110) s.p.

$\downarrow -5\%$

new c.p. (95) $\xrightarrow{+20\%}$ (114) new s.p.

$\therefore$ new s.p. - s.p. = $114 - 110 = 4$
but the given difference = Rs. 80
 $\therefore 4 = 80$

$\therefore 100 = \frac{80}{4} \times 100 = 2000$

547. A shopkeeper sells an article at a loss of $12\frac{1}{2}\%$. Had he sold it for Rs. 51.80 more, he would have earned a profit of 6%. The cost price of the article is :

- (a) Rs. 280 (b) Rs. 300
(c) Rs. 380 (d) Rs. 400

Sol. (d) C.P. of 7 oranges = Rs. 3 to gain 33%

S.P. of 100 oranges

$$= \frac{3.99}{7} \times 100 = 57$$

541. 12 copies of a book were sold for Rs. 1800/- thereby gaining cost-price of 3 copies. The cost price of a copy is:

- (a) Rs. 120/- (b) Rs. 150/-
(c) Rs. 1200/- (d) Rs. 1500/-

Sol. (a) s.p. of 12 copies = Rs. 1800 (given)

let c.p. of each copy = 9 Re. 1

$\therefore$ gain = c.p. of 3 copies = Rs. 3

& c.p. of 12 copies = Rs. 12

$\therefore$ s.p. of 12 copies = gain + c.p. of 12 copies = $3 + 12 = 15$

$\therefore 15 \cong \frac{1800}{15} = \text{Rs. } 120$

CP of a Copy = Rs. 120

542. An article is sold at a loss of 10%. Had it been sold for Rs. 9 more, there would have been a

gain of $12\frac{1}{2}\%$ on it. The cost price of the article is :

- (a) Rs. 40 (b) Rs. 45
(c) Rs. 50 (d) Rs. 35

Sol. (a) Let c.p. of the article = Rs. 100

c.p. (100) $\xrightarrow{-10\%}$ (90) s.p.(I)

$\downarrow +12\frac{1}{2}\%$
(112.5) s.p.(II)

$\therefore$ s.p. (I) - s.p. (II) = 22.5
but the given difference = Rs. 9

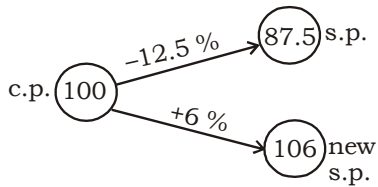
$\therefore 22.5 = 9$

$\Rightarrow 100 = \frac{9}{22.5} \times 100 = \text{Rs. } 40$

i.e. c.p. of the article = Rs. 40



Sol. (a) Let c.p. of the article
= Rs. 100



∴ difference in S.P.s = 106

$$- 87.5 = 18.5$$

$$∴ 18.5 = 51.8$$

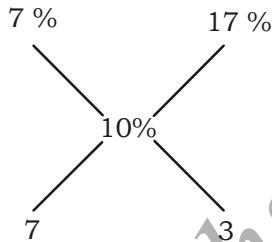
$$⇒ 100 = \frac{51.8}{18.5} \times 100 = 280$$

i.e. c.p. of the article = Rs. 280

548. A man had 100 kgs of sugar, part of which he sold at 7% profit and rest at 17% profit. He gained 10% on the whole. How much did he sell at 7% profit?

- (a) 65 kg (b) 35 kg
(c) 30 kg (d) 70 kg

Sol. (d) By Alligation Rule,



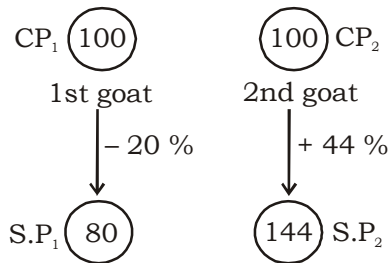
∴ part sell at 7% profit

$$= \frac{7}{7+3} \times 100 = \text{Rs. } 70$$

549. A man bought two goats for Rs. 1008. He sold one at a loss of 20% and other at a profit of 44%. If each goat was sold for the same price the cost price of the goat which was sold at loss, was :

- (a) Rs. 648 (b) Rs. 360
(c) Rs. 568 (d) Rs. 440

Sol. (a) Let c.p. of each goat = Rs. 100



But, given that S.P. of both goats is same. To make equal, multiplied SP_1 by 9 and SP_2 by 5

$$∴ CP_1 = 100 \times 9 = 900$$

$$\& CP_2 = 100 \times 5 = 500$$

$$⇒ CP_1 : CP_2 = 9 : 5$$

$$∴ CP_1 = \frac{9}{14} \times 1008 = \text{Rs. } 648$$

550. On selling 17 balls at Rs. 720, there is a loss equal to the cost price of 5 balls. The cost price of a ball is :

- (a) Rs. 45 (b) Rs. 50
(c) Rs. 60 (d) Rs. 55

Sol. (c) Let c.p. of each ball = Re. 1

$$∴ \text{Loss} = \text{c.p. of 5 balls} = \text{Rs. } 5$$

$$\& \text{S.P. of 17 balls} = \text{C.P. of 17 balls} - \text{Loss}$$

$$= 17 - 5 = \text{Rs. } 12$$

$$∴ 12 = 720$$

$$⇒ 1 = \frac{720}{12} = 60$$

i.e. c.p. of each ball = Rs. 60

551. A person bought some articles at the rate of 5 per rupee and the same number at the rate of 4 per rupee. He mixed both the types and sold at the rate of 9 for 2 rupees. In this business he suffered a loss of Rs. 3. The total number of articles bought by him was :

- (a) 1090 (b) 1080
(c) 540 (d) 545

Sol. (b)

Articles	Price	Price of one Article
(I) 5	1(c.p.)	→ Rs. $\frac{1}{5}$
(II) 4	1(c.p.)	→ Rs. $\frac{1}{4}$
(III) 9	2(s.p.)	→ Rs. $\frac{2}{9}$

$$∴ \text{L.C.M. of } (5, 4, 9) = 180$$

Let the bought 180 articles in each case (I) & (II) because it is given that in both cases same no. of articles bought.

∴ In case (I), price of 180

$$\text{articles} = \frac{1}{5} \times 180 = 36$$

& In case (II), price of 180

$$\text{articles} = \frac{1}{4} \times 180 = 45$$

∴ In case (III), price of 360

$$\text{article} = \frac{2}{9} \times 360 = 80$$

$$∴ \text{Total C.P.} = 36 + 45 = \text{Rs. } 81$$

$$\& \text{total S.P.} = \text{Rs. } 80$$

$$∴ \text{loss} = 81 - 80 = \text{Rs. } 1$$

but the given loss = Rs. 3

$$∴ 1 = 3$$

$$∴ 360 = 3 \times 360 = 1080$$

i.e. total no. of article bought = 1080

552. A loss of 20% is incurred when 6 articles are sold for a rupee. To gain 20% how many articles should be sold for a rupee?

- (a) 1 (b) 2
(c) 3 (d) 4

Sol. (d) S.P. of 6 articles = Re. 1

$$\text{loss} = 20\% = \frac{1}{5} \rightarrow \text{loss} \Rightarrow \text{S.P.} = 5 - 1 = 4$$

$$∴ \text{C.P.} : \text{S.P.}$$

$$\begin{array}{cc} 5 & : & 4 \\ \downarrow \times \frac{1}{4} & & \downarrow \times \frac{1}{4} \\ 1.25 & & 1 \end{array}$$

i.e. C.P. of 6 articles = Re 1.25

To gain of 20%

$$\text{P. of 6 articles} = 1.25 + 20\% \text{ of } 1.25 = 1.25 + 0.25 = \text{Rs. } 1.50$$

$$∴ \text{Articles sold in Re } 1 = \frac{6}{1.50} \times 1 = 4$$

553. If the price of eraser is reduced by 25% a person can buy 2 more erasers for a rupee. How many erasers are available for a rupee?



- (a) 8 (b) 6
(c) 4 (d) 2

Sol. (a) $25\% = \frac{1}{4}$

	Initial	Final
Price	4	4 - 1 = 3

Quantity	3	4
	↓	
	4 - 3 = 1	
	more eraser	

$$\left[\because \text{Price} \propto \frac{1}{\text{Quantity}} \right]$$

i.e. $1 = 2$

$\therefore$ Initial quantity = $3 \times 2 = 6$
in Re. 1

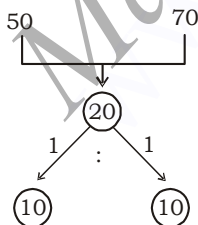
& Final quantity
= $4 \times 2 = 8$ in Re. 1

$\therefore$ Final (or reduced) quantity of
eraser = 8

554. The percentage of loss when an article is sold at Rs. 50 is the same as that of the profit when it is sold at Rs. 70. The above mentioned of profit or loss on the article is :

- (a) 10 % (b) $16\frac{2}{3}\%$
(c) 20 % (d) $22\frac{2}{3}\%$

Sol. (b) Given, Loss % (when S.P. = 50) : Profit % (when S.P. = 70) = 1 : 1



$\therefore$ C.P. of the article = $50 + 10$ or $70 - 10 = \text{Rs. } 60$

$\therefore$ Required % = $\frac{10}{60} \times 100 = 16\frac{2}{3}\%$

555. Raghavan purchased a scooter at $\frac{13}{15}$ of its selling price and sold it at 12 % more than its selling price. His gain is :

- (a) 20 % (b) 30 %
(c) $38\frac{1}{13}\%$ (d) $29\frac{3}{13}\%$

Sol. (d) Let S.P. of the scooter = Rs. 150

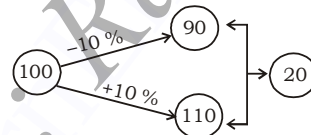
$\therefore$ C.P. of the scooter = Rs. 130
new S.P. of the scooter = Rs. $(150 + 18) = \text{Rs. } 168$

$\therefore$ gain % = $\frac{38}{130} \times 100 = \frac{380}{13}$
= $29\frac{3}{13}\%$

556. A man sells an article at 10 % loss. If he had sold it at Rs. 10 more, he would have gained 10 %. The cost price of the article is :

- (a) Rs. 50 (b) Rs. 55
(c) Rs. 100 (d) Rs. 110

Sol. (a) Let C.P. of the article = Rs. 100



$\therefore 20 = 10$

$\Rightarrow 100 = \frac{10}{20} \times 100 = 50$

i.e. c.p. of the article = Rs. 50

557. A book seller sells a book at a profit of 10 %. If he had bought it at 4 % less and sold it for Rs. 6 more, he would have gained $18\frac{3}{4}\%$. The cost price of the book is :

- (a) Rs. 130 (b) Rs. 140
(c) Rs. 150 (d) Rs. 160

Sol. (c) Let C.P. of the book = Rs. 100

$\therefore$ difference = $114 - 110 = 4$

$\Rightarrow 4 \cong 6$

$\therefore 100 \cong \frac{6}{4} \times 100 = 150$

i.e. C.P. of the book = Rs. 150

558. A car and a jeep were sold for Rs. 120,000 each. The car was sold at a loss of 20 % while the jeep at a gain of 20 %. The entire transaction resulted in:

- (a) neither loss nor gain
(b) gain of Rs. 1000
(c) loss of Rs. 10000
(d) gain of Rs. 500

Sol. (c) As, S.P. of both articles is same

$\therefore$ loss % in whole transaction

= $\frac{x^2}{100} = \frac{(20)^2}{100} = 4\%$

Note:-

$$20 - 20 - \frac{20 \times 20}{100} = -4\%$$

$4\% = \frac{1}{25} \rightarrow \text{loss}$
 $\frac{1}{25} \rightarrow \text{c.p.} \Rightarrow \text{S.P.}$

= $25 - 1 = 24$

$\therefore$ loss : S.P.

1 : 24

But the given total S.P. of both the articles = Rs. 240000

i.e. $24 \cong 240000$

$\therefore 1 \cong \frac{240000}{24} = 10,000$

i.e. loss = Rs. 10,000

559. Mohan bought 25 books for Rs. 2,000 and sold them at a profit equal to the selling price of 5 books. The selling price of 1 book is :

- (a) Rs. 100 (b) Rs. 120
(c) Rs. 150 (d) Rs. 200

Sol. (a) Let S.P. of each book = Re. 1

$\therefore$ profit = S.P. of 5 books = Rs. 5
& S.P. of 25 books = Rs. 25

$\therefore$ C.P. of 25 books = S.P. of 25 book - profit = $25 - 5 = 20$

i.e. $20 = 2000$

$\therefore 1 = \frac{2000}{20} = 100$

i.e. S.P. of one book = Rs. 100

560. A man buys a field of agricultural land for Rs. 3,60,000. He sells one-third at a



$$\begin{array}{rcl}
 \text{Land} & \text{Profit/loss} & \\
 \frac{1}{3} \times 15 & \times (-20) & = -100 \\
 \frac{2}{5} \times 15 & \times (+25) & = 150 \\
 \text{Remaining} & 4 \times x & = 100 \\
 \hline
 15 & \times 10 & = 150
 \end{array}$$

$$\therefore x = \frac{100}{4} = 25\%$$

remaining part is sold at 25% profit

$$\begin{aligned}
 \therefore \text{SP} &= \frac{4}{15} \times (360000) + 25 \times 96000 \\
 \text{SP} &= 120000
 \end{aligned}$$

561. If the selling price of an article is doubled, then its loss per cent is converted into equal profit per cent. The loss per cent on the article is :

$$(a) 26\frac{2}{3} \% \quad (b) 33 \%$$

$$(c) 33\frac{1}{3} \% \quad (d) 34 \%$$

Sol. (c) Let the C.P. of the article be Rs. 100 and its S.P. be Rs. x.

$$\begin{aligned}
 \therefore \frac{100 - x}{100} \times 100 &= \frac{2x - 100}{100} \times 100 \\
 \Rightarrow 100 - x &= 2x - 100 \\
 \Rightarrow x &= \frac{200}{3}
 \end{aligned}$$

$$\begin{aligned}
 \therefore \text{Loss \%} &= 100 - \frac{200}{3} = \frac{100}{3} \\
 &= 33\frac{1}{3} \%
 \end{aligned}$$

[because CP of the article = Rs. 100]

655. A shopkeeper bought 80 kg of sugar at the rate of Rs. 13.50 per kg. He mixed it with 120 kg of sugar costing Rs. 16 per kg. In order to make a profit of 20%, he must sell the mixture at:

- (a) Rs. 18 per kg
(b) Rs. 17 per kg
(c) Rs. 16.40 per kg
(d) Rs. 15 per kg

$$\begin{aligned}
 \text{Sol. (a) CP of 200 kg sugar} &= \text{Rs. } (80 \times 13.50 + 120 \times 16) \\
 &= \text{Rs. } (1080 + 1920) = \text{Rs. } 3000
 \end{aligned}$$

$$\begin{aligned}
 \therefore \text{C.P of 1 kg of sugar} &= \frac{3000}{200} \\
 &= \text{Rs. } 15
 \end{aligned}$$

$\therefore$ To gain 20 %, S.P.

$$= 15 \times \frac{120}{100} = \text{Rs. } 18/\text{kg}$$

562. Some toffees were bought at the rate of 11 for Rs. 10 and the same number at the rate of 9 for Rs. 10. If the whole lot was sold at one rupee per toffee, then the gain or loss in the whole transaction was :

- (a) loss of 1 %
(b) gain of 1 %
(c) neither gain nor loss
(d) gain of 1.5 %

Sol. (a)

	Toffees	Price	Price of each toffee
(I)	11	10(c.p.)	$\rightarrow \frac{10}{11}$
(II)	9	10(c.p.)	$\rightarrow \frac{10}{9}$
(III)	1	1(s.p.)	$\rightarrow \frac{1}{1}$

$$\text{L.C.M. of } (11, 9, 1) = 99$$

Let he bought 99 toffees in each case

$\therefore$ In case (I), C.P.

$$= \frac{10}{11} \times 99 = \text{Rs. } 90$$

In case (II), C.P.

$$= \frac{10}{9} \times 99 = \text{Rs. } 110$$

In case (III), S.P.

$$= \frac{1}{1} \times (99 + 99) = \text{Rs. } 198$$

$$\therefore \text{Total C.P.} = 90 + 110$$

$$= \text{Rs. } 200 \text{ \& total S.P.} = \text{Rs. } 198$$

$$\therefore \text{loss \%} = \frac{2}{200} \times 100 = 1\%$$

563. A man buys a certain number of oranges at 20 for Rs. 60 and an equal number at 30 for Rs. 60. He mixes them and sells them at 25 for Rs. 60. What is gain or loss per cent ?

- (a) Gain of 4 %
(b) Loss of 4 %

loss of 20 % and two -fifths at a gain of 25 %. At what price must he sell the remaining field so as to make an overall profit of 10 % ?

- (a) Rs. 1,00,000
(b) Rs. 1,15,000
(c) Rs. 1,20,000
(d) Rs. 1,25,000

Sol. (c) Sells $\frac{1}{3}$ at a loss of 20 % and

$$\frac{2}{5} \text{ at a gain of } 25 \%$$

$\therefore$ Then remaining 1

$$- \left(\frac{1}{3} + \frac{2}{5} \right) = \frac{4}{15} \text{ at } x \%$$

$$\frac{1}{3} \times (-20\%) = -\frac{20}{3} \%$$

$$\frac{2}{5} \times (+25\%) = +10\%$$

$$\frac{4}{15} \times x \% = P$$

overall gain = 10 %

for overall gain of 10 %, P

should be $\frac{20}{3}$

$$\text{or } -\frac{20}{3} + 10 + P = 10 \Rightarrow P = \frac{20}{3}$$

$$\therefore \frac{4}{15} \times x \% = \frac{20}{3} \Rightarrow x = 25\%$$

Now, cost price of $\frac{4}{15}$ part of the

$$\text{field} = \frac{4}{15} \times 3,60,000 = 96000$$

$\therefore$ selling price of this part

$$= \text{Rs. } (96000 + 25 \% \text{ of } 96000)$$

$$= \text{Rs. } (96000 + 24000)$$

$$= \text{Rs. } 1,20,000$$

Alternate:

Take total part of land [LCM of (3,5)] = 15



I	II	III	IV
400	400	400	400
↓ _{120%}	↓ _{120%}	↓ _{80%}	↓ _{100%}
480	480	320	400
Total = 1680, Profit			
= 1680 - 1600 = 80,			

$$\text{Profit}\% = \frac{80}{1600} \times 100 = 5\%$$

565. If selling price of an article is reduced by 60 %, then there is a loss of 10 % on cost price. The initial profit percent was :

- (a) 70 (b) 80
(c) 100 (d) 125

Sol. (d) Let C.P. of the article = Rs. 100

$$60\% = \frac{3}{5}$$

$$\therefore \text{let initial S.P.} = 5$$

$$\therefore \text{new S.P.} = 5 - 3 = 2$$

$$\text{at new S.P.} = 100 - 10\% \text{ of } 100 = 90$$

$$\text{i.e. } 2 \cong 90 \Rightarrow 5 \cong 225$$

$$\therefore \text{Initial profit \%}$$

$$= \frac{225 - 100}{100} \times 100 = 125\%$$

566. A man sold 20 apples for Rs. 100 and gained 20 %. How many apples did he buy for Rs. 100 ?

- (a) 20 (b) 22
(c) 24 (d) 26

Sol. (c) S.P. of 20 apples = Rs. 100

$$\text{gain} = 20\% = \frac{1}{5} \rightarrow \text{gain}$$

$$\Rightarrow \text{S.P.} = 5 + 1 = 6$$

$$\therefore \text{C.P.} : \text{S.P.}$$

$$\begin{array}{ccc} 5 & : & 6 \\ \downarrow \times \frac{50}{3} & & \downarrow \times \frac{50}{3} \\ 250 & & 100 \\ 3 & & \end{array}$$

$$\text{i.e. C.P. of 20 apples} = \text{Rs. } \frac{250}{3}$$

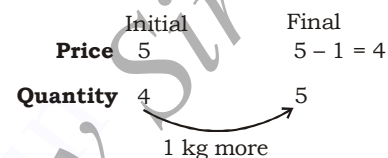
$$\therefore \text{in Rs. 100, he bought}$$

$$= \frac{20}{250} \times 3 \times 100 = 24$$

567. A reduction of 20 % in the price of sugar enables me to purchased 5 kg more for Rs. 600. Find the price of sugar per kg before reduction of price:

- (a) Rs. 24 (b) Rs. 30
(c) Rs. 32 (d) Rs. 36

$$\text{Sol. (b) } \therefore 20\% = \frac{1}{5}$$



$$\therefore 1 \cong 5$$

$$\therefore \text{quantity} = 4 \times 5$$

$$= 20 \text{ in Rs. 600}$$

$$\therefore \text{Initial price of sugar per kg}$$

$$= \frac{600}{20} = \text{Rs. 30}$$

Alternate:-

Old Price

$$= \frac{x\% \times \text{Rs.}}{\text{extra quantity} \times (100 \pm x\%)}$$

$$= \frac{20 \times 600}{5 \times 80} = \text{Rs. 30}$$

568. A man bought oranges at the rate of 8 for Rs. 34 and sold them at the rate of 12 for Rs. 57. how many oranges should he sold to earn a net profit of Rs. 45 ?

- (a) 90 (b) 100
(c) 135 (d) 150

(a) Oranges	Price
8	34 (c.p.)
12	57 (s.p.)

Now,

$$\text{L.C.M. of 8, 12} = 24$$

$\therefore$ Let he buys (or sells) 24 oranges.

$$\therefore \text{C.P. of 24 oranges} = 34 \times 3 = \text{Rs. 102}$$

$$\& \text{S.P. of 24 oranges} = 57 \times 2 = \text{Rs. 114}$$

$$\therefore \text{profit} = 114 - 102 = \text{Rs. 12}$$

i.e. for a profit of Rs. 12, no. of oranges sold = 24

- (c) Neither gain nor loss
(d) Loss of 5 %

Sol. (b)

Oranges	Price	Price per orange
(I) 20	60(c.p.) $\rightarrow$	$\frac{60}{20} = 3$
(II) 30	60(c.p.) $\rightarrow$	$\frac{60}{30} = 2$
(III) 25	60(s.p.) $\rightarrow$	$\frac{60}{25} = 2.4$

total C.P. in case (I) & (II)

$$= 3 + 2 = \text{Rs. 5}$$

$\therefore$ total S.P. in case (III)

$$= 2.4 \times 2 = \text{Rs. 4.8}$$

$$\therefore \text{loss \%} = \frac{0.2}{5} \times 100 = 4\%$$

564. A cloth merchant sold half of his cloth at 20 % profit, half of the remaining cloth at 20 % loss and the rest was sold at his cost price. In the total transaction, his gain or loss will be:

- (a) 5 % profit
(b) neither loss nor gain
(c) 5 % loss
(d) 10 % profit

Sol. (a) Sold, $\frac{1}{2}$ at 20 % profit and

$$\frac{1}{2} \text{ of remaining i.e. } \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

at 20% loss & in remaining $\frac{1}{4}$, there is no profit or loss as he sold it at cost price.

$$\therefore \frac{1}{2} (+20\%) = 10\%$$

$$\frac{1}{4} (-20\%) = -5\%$$

$$\therefore \text{total profit} = 10 - 5 = 5\%$$

Alternate:-

Let each cloth = Rs. 400



∴ for a profit of Rs. 45, no. of oranges sold = $\frac{24}{12} \times 45 = 90$

569. A man sells two articles for Rs. 5000 each neither losing nor gaining in the deal. If he sold one of them at a gain of 25 %, the other article is sold at a loss of :

- (a) $15\frac{2}{3}\%$ (b) $16\frac{2}{3}\%$
(c) $17\frac{1}{3}\%$ (d) $18\frac{1}{3}\%$

Sol. (b) C.P. of first article

$$= 5000 \times \frac{100}{125} = \text{Rs. } 4000$$

$$\text{i.e. profit on first} = 5000 - 4000 = \text{Rs. } 1000$$

∴ Loss on second article = Rs. 1000

∴ C.P. of second article = $5000 + 1000 = \text{Rs. } 6000$

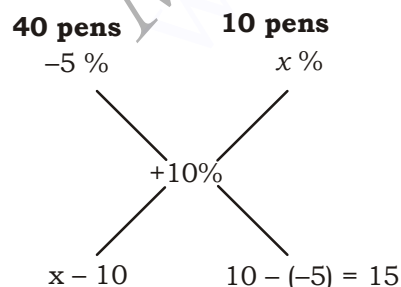
$$\therefore \text{loss \%} = \frac{1000}{6000} \times 100$$

$$= \frac{1}{6} \times 100 = 16\frac{2}{3}\%$$

570. A person bought 50 pens for Rs. 50 each. he sold 40 of them at a loss of 5 %. He wants to gain 10 % on the whole. Then his gain per cent on the remaining pens should be :

- (a) 15 (b) 40
(c) 50 (d) 70

Sol. (d) By Alligation Rule,



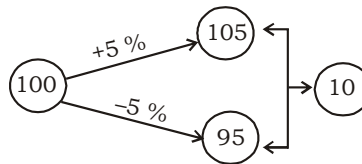
$$\therefore \frac{x-10}{15} = \frac{4}{1} \Rightarrow x-10 = 60$$

$$\Rightarrow x = 70\%$$

571. Selling an article at a profit of 5 %, Mr. X get Rs. 150 more than selling it at a loss of 5%. Mr. X purchased the article at :

- (a) Rs. 15000 (b) Rs. 1500
(c) Rs. 150 (d) Rs. 15

Sol. (b) Let c.p. of the article = Rs. 100



$$\text{i.e. } 10 \cong 150$$

$$\Rightarrow 100 \cong 1500$$

i.e. c.p. of the article = Rs. 1500

572. By selling 14 watches of equal cost price at the rate of Rs. 450 each, there is a profit equal to the cost price of 4 watches. The cost price of a watch is :

- (a) Rs. 350 (b) Rs. 360
(c) Rs. 375 (d) Rs. 400

Sol. (a) Let C.P. of each watch = Re. 1

∴ Profit = C.P. of 4 watches = Rs. 4

& C.P. of 14 watches = Rs. 14

∴ S.P. of 14 watches = Profit + C.P. of 14 watches = $4 + 14 = 18$

but, the given S.P. of 14 watches = Rs. 450×14

$$\text{i.e. } 18 \cong 450 \times 14$$

$$\therefore 1 \cong \frac{450}{18} \times 14 = 350$$

i.e. C.P. of each article = Rs. 350

573. A person sold an article at 20 % profit on the selling price. Afterwards, when the cost price reduced by 10 %, then he also reduced the selling price by 10 %. His percentage of profit on cost price will be :

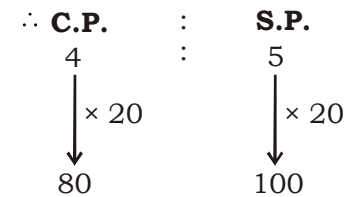
- (a) 30 (b) 25
(c) 22.5 (d) 12.5

Sol. (b) Let S.P. of the article = Rs. 100
Profit = 20 % (on S.P.)

$$= \frac{1}{5} \rightarrow \text{profit}$$

$$= \frac{1}{5} \rightarrow \text{s.p.}$$

$$\Rightarrow \text{CP} = 5 - 1 = 4$$



i.e. C.P. of the article = Rs. 80

∴ New C.P. of the article

$$= \text{Rs. } (80 - 10\% \text{ of } 80) = \text{Rs. } 72$$

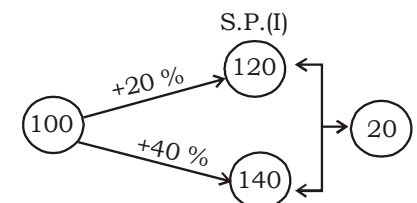
& New S.P. of the article = Rs. $(100 - 10\% \text{ of } 100) = \text{Rs. } 90$

$$\therefore \text{New gain \%} = \frac{90 - 72}{72} \times 100 = 25\%$$

574. A fruit seller makes a profit of 20 % by selling mangoes at a certain price. If he charges Rs. 1 more for each mango, he can make a profit of 40%. Find the selling price of a mango in the first case :

- (a) Rs. 6 (b) Rs. 5
(c) Rs. 5050 (d) Rs. 7

Sol. (a) Let the C.P. of a mango = Rs. 100



$$\text{i.e. } 20 \cong 1$$

$$\Rightarrow 120 \cong \frac{1}{20} \times 120 = 6$$

i.e. initial S.P. = Rs. 6

574. Dinesh bought two radios for Rs. 1,920. He sold one at a profit of 20 % and the other at a loss

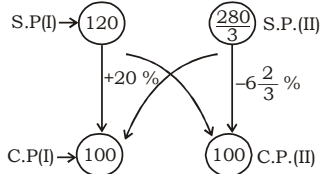
of $6\frac{2}{3}\%$. If the selling price of

both radios are same, the cost prices of the two radios are :

- (a) Rs. 800 and Rs. 1,120
(b) Rs. 840 and Rs. 1,080
(c) Rs. 860 and Rs. 1,060
(d) Rs. 900 and Rs. 1,020



Sol. (b) Let C.P. of each radio = Rs. 100



$\therefore$ S.P. (I) = S.P. (II) (given)

$$\therefore \text{C.P. (I) : C.P. (II)} = \frac{280}{3} : 120$$

$$= 7 : 9$$

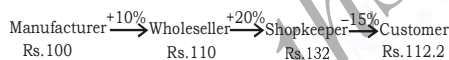
$$\therefore \text{C.P. (I)} = \frac{7}{16} \times 1920 = \text{Rs. 840}$$

$$\text{C.P. (II)} = \frac{9}{16} \times 1920 = \text{Rs. 1080}$$

575. A manufacturer sells an article to a wholesale dealer at a profit of 10 %. The wholesale dealer sells it to a shopkeeper at 20% profit. The shopkeeper sells it to a customer for Rs 56,100 at a loss of 15 %. Then the cost price of the article to the manufacturer is :

- (a) Rs. 25,000
(b) Rs. 10,000
(c) Rs. 50,000
(d) Rs. 55,000

Sol. (c) Let the C.P. of the article to manufacturer = Rs. 100



$$\text{i.e. } 112.2 = 56100$$

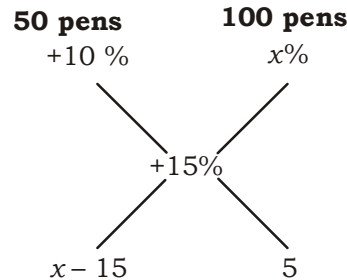
$$\Rightarrow 100 = \frac{56100}{112.2} \times 100 = 50,000$$

i.e. the required C.P.
= Rs. 50,000

576. A man purchased 150 pens at the rate of Rs. 12 per pen. He sold 50 pens at a gain 10 %. The percentage gain at which he must sell the remaining pens so as to gain 15 % on the whole outlay is:

- (a) $21\frac{1}{2}\%$ (b) 20 %
(c) 17 % (d) $17\frac{1}{2}\%$

Sol. (d) By Alligation rule,



$$\text{i.e. } \frac{x-15}{5} = \frac{50}{100}$$

$$\Rightarrow 2x - 30 = 5$$

$$\Rightarrow 2x = 35$$

$$\Rightarrow x = \frac{35}{2} = 17\frac{1}{2}\%$$

Alternate:

$$150 \times 12 = 1800 \text{ (total)}$$

$$\therefore \frac{1}{3} \text{ of } 150 = 50$$

these pens (50) is sold at 10%

$$= 12 \times \frac{110}{100} = 13.2$$

$\therefore$ By selling these 50 articles we get = $50 \times 13.2 = 660$
we gain 115% on the whole outlay

$$\therefore \frac{1800}{100} \times 15 = \text{Rs. 270}$$

$\therefore$ we gain $(270 - 60) = \text{Rs. 210}$ at remaining

$\therefore$ remaining is $(1800 - 600)$

$$= 1200 = \frac{210}{1200} \times 100 = 17\frac{1}{2}\%$$

577. A trader purchases a watch and a wall clock for Rs. 390. He sells them making a profit of 10 % on the watch and 15 % on the wall clock. He earns a profit of Rs. 51.50. The difference between the original prices of the wall clock and the watch is equal to :

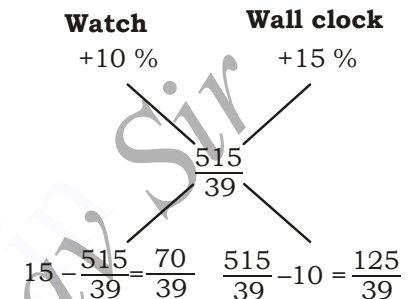
- (a) Rs. 80 (b) Rs. 120
(c) Rs. 110 (d) Rs. 100

Sol. (c) Net profit = Rs. 51.50

$$\therefore \text{Net profit \%} = \frac{5150}{39000} \times 100$$

$$= \frac{515}{39}\%$$

By Alligation Rule,



$$\therefore \text{C.P. (watch) : C.P. (wall clock)}$$

$$= \frac{70}{39} : \frac{125}{39} = 14 : 25$$

$$\therefore \text{C.P. (watch)} = \frac{14}{39} \times 390 = \text{Rs. 140}$$

& C.P. (wall clock)

$$= \frac{25}{39} \times 390 = \text{Rs. 250}$$

hence, the required difference
= $250 - 140 = \text{Rs. 110}$

578. A man sells two chairs at Rs. 120 each and by doing so gains 25 % on one chair and loses 25 % on the other. His loss on the whole in Rs. is:

- (a) 20 (b) 16
(c) 25 (d) 30

Sol. (b) $\therefore$ S.P. of two chairs is same

$$\therefore \text{loss \%} = \frac{25 \times 25}{100} = 6.25\%$$

$$\text{Now, } 6.25\% = \frac{6.25}{100}$$

$$= \frac{1}{16} \rightarrow \text{loss}$$

$$\Rightarrow \text{S.P.} = 16 - 1 = 15$$

$\therefore$ loss : s.p.

$$1 : 15$$

but the given s.p. of both chair
= Rs. 240

$$\therefore 15 = 240$$

$$\Rightarrow 1 = \frac{240}{15} = 16$$

i.e. loss = Rs. 16



579. A sold a tape-recorder to B for Rs. 4,860 at a loss of 19 %. Again B sold it to C at a price that would give A a profit of 17 %. The gain of B is :

- (a) Rs. $22\frac{2}{9}\%$ (b) $33\frac{1}{3}\%$
(c) $44\frac{4}{9}\%$ (d) $66\frac{2}{3}\%$

Sol. (c) S.P. of recorder for A
= Rs. 4,860

$$\text{loss \%} = 19\% = \frac{19}{100} \rightarrow \text{loss}$$

$$\Rightarrow \text{S.P.} = 100 - 19 = 81$$

C.P.	:	S.P.
100	:	81
↓ × 60		↓ × 60
6000		4860

i.e. C.P. of recorder for A
= Rs. 6000

$$\therefore \text{S.P. of B} = 6000 + 17\% \text{ of } 6000$$

$$= 6000 + 1020 = \text{Rs. } 7020$$

$$\text{B's gain} = 7020 - 4860 = 2160$$

$\therefore$ Required gain %

$$= \frac{2160}{4860} \times 100 = 44\frac{4}{9}\%$$

580. A makes an article for Rs. 120 and sells it to B at a profit of 25 %. B sells it to C who sells it for Rs. 198, making a profit of 10 %. What profit percent did B make ?

- (a) 25 % (b) 20 %
(c) 16.66 % (d) 15 %

Sol. (b) Given C.P. for A is 120

$$25\% = \frac{1}{4} \rightarrow \text{Profit}$$

$$\frac{1}{4} \rightarrow \text{C.P.}$$

$$\text{S.P.} = 120 \times \frac{5}{4} = 150$$

S.P. for C after 10 % profit is 198

$$10\% = \frac{1}{10} \rightarrow \text{Profit}$$

$$\frac{1}{10} \rightarrow \text{C.P.}$$

Then C.P. for C will be

$$= 198 \times \frac{10}{11} = 180$$

C.P. for B is 150 and S.P. is 180

$$\text{Profit \%} = \frac{30}{150} \times 100 = 20\%$$

581. A milkman purchases the milk at Rs. x per litre and sells it at Rs. $2x$ per litre still he mixes 2 litres water with every 6 litres of pure milk. What is the profit percentage ?

- (a) 116 % (b) 166.66 %
(c) 60 % (d) 100 %

Sol. (b) C.P. of 6 litre = $6x$

$$\text{S.P. of } \left(\frac{6+2}{m \quad w} \right) 8 \text{ litre} = 8 \times 2x =$$

$$16x$$

$$\text{Profit \%} = \frac{10x}{6x} \times 100 = 166.66\%$$

582. A trader procures his goods from a wholesaler, whose balance reads 1200 g for 1000g. The trader sells all the procured goods to a customer after marking up the goods at 20 % above the cost price. What is his overall percentage profit or loss in the whole transaction?

- (a) 38 % profit
(b) 50 % profit
(c) no profit no loss
(d) none of the above

Sol. (c) Let C.P. of 1200g = 1200

So, C.P. for 1000g = 1000

$$20\% = \frac{1}{5} \rightarrow \text{Increase}$$

$$\frac{1}{5} \rightarrow \text{Previous value}$$

Selling price

$$= 1000 \times \frac{6}{5} = 1200$$

So, No profit no loss.

583. A retailer increases the selling price by 25 % due to which his profit percentage increases from 20 % to 25 %. What is the percentage increase in cost price ?

- (a) 20 % (b) 30 %
(c) 25 % (d) 50 %

Sol. (a)

C.P.	100	S.P.	120
		× $\frac{5}{4}$	25 %
New S.P.	=	150	
So, C.P.	=	$\frac{150 \times 4}{5}$	(because P % = 25)
New C.P.	=	120	

increased by = 20 %

584. A shopkeeper bought two cycles in Rs. 1600. If he sold first cycle at 10 % profit & the 2nd at 20 % profit, he earns certain profit. If he sold first at 20 % profit and the second at 10 % profit, he got Rs. 5 more. The prices of both the cycles?

- (a) Rs. 825 & Rs. 775
(b) Rs. 600 & Rs. 1000
(c) Rs. 900 & Rs. 700
(d) Rs. 850 & Rs. 750

Sol. (a) $10\% = \frac{1}{10}$ & $20\% = \frac{1}{5}$

Let price of 1st cycle = Rs. C_1
& that of 2nd cycle = Rs. C_2

$$\therefore \frac{1}{10} C_1 + \frac{1}{5} C_2 = \text{Profit} \quad \dots(i)$$

$$\text{and } \frac{1}{5} C_1 + \frac{1}{10} C_2 = \text{Profit} + 5$$

$$\dots(ii)$$

By (i) - (ii), we get

$$C_1 - C_2 = 5 \times 10 = \text{Rs. } 50 \quad \dots(iii)$$

and given, $C_1 + C_2 = \text{Rs. } 1600$
 $\dots(iv)$

On solving (iii) & (iv), we get

$$C_1 = 825 \text{ \& } C_2 = 775$$

Short-cut : when both are sold at certain profit

$10\% = \frac{1}{10}$	& $20\% = \frac{1}{5}$
⓪	⓪
↓	
LCM = 10	

$$\text{\& Ratio} = 10 : 5 = 2 : 1$$

$$\text{difference} = 1$$

$$\therefore \text{Difference of prices} = C_1 - C_2$$

$$= \frac{\text{LCM} \times \text{profit difference}}{\text{Difference of ratio}} = \frac{10 \times 5}{1} = 50$$



& given, $C_1 + C_2 = 1600$

On solving both the above equations, we get C_1 or C_2
 $= 825/-$ & C_2 or $C_1 = 775/-$

585. A shopkeeper sells the table at

$12\frac{1}{2}\%$ profit and a chair at

$8\frac{1}{3}\%$ loss, he got Rs. 25 as a profit. If he sells the table at

$8\frac{1}{3}\%$ loss and the chair at

$12\frac{1}{2}\%$ profit, he neither gain nor loss. The price of table and chair respectively are :

- (a) Rs. 240, Rs. 360
 (b) Rs. 200, Rs. 400
 (c) Rs. 360, Rs. 240
 (d) Rs. 340, Rs. 260

Sol. (c) $12\frac{1}{2}\% = \frac{1}{8}$, $8\frac{1}{3}\% = \frac{1}{12}$

Let, the price of table = Rs T
 & the price of chair = Rs C

$$\frac{1}{8}T - \frac{1}{12}C = 25 \quad \dots(i)$$

$$-\frac{1}{12}T + \frac{1}{8}C = 0 \quad \dots(ii)$$

By (i) + (ii) we get

$$\left(\frac{1}{8} - \frac{1}{12}\right)T + \left(\frac{1}{8} - \frac{1}{12}\right)C = 25$$

$$\Rightarrow \frac{3-2}{24}T + \frac{3-2}{24}C = 25$$

$$\Rightarrow T + C = \frac{25 \times 24}{(3-2)} = 600 \quad \dots(iii)$$

and from (ii), we get

$$\frac{1}{12}T = \frac{1}{8}C \Rightarrow \frac{T}{C} = \frac{3}{2}$$

$$\Rightarrow T : C = 3 : 2 \quad \dots(iv)$$

$$\Rightarrow T : C = 3 : 2 \xrightarrow{(3+2)=5} \begin{array}{ccc} \times 120 & & \times 120 \\ \downarrow & & \downarrow \\ 360 & 240 & 600 \end{array}$$

i.e. price of table = Rs. 360

& price of chair = Rs. 240

Short-cut : when one sold at profit & other at loss.

$$12\frac{1}{2}\% = \frac{1}{8} \quad 8\frac{1}{3}\% = \frac{1}{12}$$

$$\downarrow$$

$$\text{LCM} = 24$$

& Ratio = 8 : 12 = 2 : 3

$\therefore$ difference of ratio = 3 - 2 = 1

$\therefore$ Total price = T + C

$$= \frac{\text{LCM} \times \text{profit difference}}{\text{difference of ratio}}$$

$$\Rightarrow T + C = \frac{24 \times 25}{1}$$

= 600 ... (iii) & from (iii) & (iv), we get

T = 360/- & C = 240/-

586. Rahul sells a pen at 5 % loss and a book at 15 % profit, he gets Rs. 7 as a profit. if he sells the pen at 5 % profit and the book at 10 % profit, he gets Rs. 6 more. The prices of book & pen respectively are:

- (a) Rs. 100, Rs. 80
 (b) Rs. 70, Rs. 90
 (c) Rs. 70, Rs. 110
 (d) Rs. 80, Rs. 100

Sol. (d) According to the question,

Pen + Book Profit

$$-5\% + 15\% \quad 7 \quad \dots(i)$$

$$+5\% + 10\% \quad 7+6=13 \quad \dots(ii)$$

By (i) + (ii), we get,

$$25\% \text{ of Book} = 7 + 13 = 20$$

$$\Rightarrow \frac{1}{4} \text{ of Book} = 20$$

$$\Rightarrow \text{Price of Book} = 80$$

$$\therefore 10\% \text{ of book} = 10\% \text{ of } 80 = \text{Rs. } 8$$

$\therefore$ from (ii),

$$5\% \text{ of pen} + 10\% \text{ of Book} = 13$$

$$\Rightarrow \frac{1}{20} \text{ of pen} = 5$$

$\Rightarrow$ price of pen = 20 $\times$ 5 = Rs. 100
 i.e. price of book = Rs. 80 & that of pen = Rs. 100

587. The cost price of 16 apples is equal to the selling price of 10 apples. The cost price of 12 oranges is equal to the selling price of 16 oranges and the cost price of 6 mangoes is equal to the selling price of 4 mangoes. if the ratio of the cost price of 1 apple, 1 orange & 1 mango is in the ratio of 1 : 1 : 2, then find the net profit percent on the sale of 1 apple, 2 oranges and 2 mangoes :

- (a) 25 % (b) 30 %
 (c) 35 % (d) 40 %

Sol. (b) Let the cost price of 1 apple be 'x', therefore cost price of 1 orange and 1 mango would be x and 2x respectively.

$$\text{S.P. of 1 apple} = \frac{16x}{10} = 1.6x$$

Selling price of 1 orange

$$= \frac{12x}{6} = 0.75x$$

$$\text{Selling price of 1 mango} = \frac{12x}{4} = 3x$$

Total cost price of 1 apple, 2 oranges and 2 mangoes
 $= x + 2x + 4x = 7x$

Total selling price of 1 apple, 2 oranges and 2 mangoes
 $= 1.6x + 1.5x + 6x = 9.1x$

$$\text{Net profit} = 9.1x - 7x = 2.1x$$

$$\therefore \text{Net profit \%} = \frac{2.1x}{7x} \times 100 = 30\%$$

Alternatively :

	CP	SP
Apple	cp of 16 = sp of 10 $\Rightarrow 10$	16
Orange	cp of 12 = sp of 16 $\Rightarrow 16$	12
Mango	cp of 6 = sp of 4 $\Rightarrow 4$	6

Given that, CP (apple) : CP (orange) : CP (mango) = 1 : 1 : 2



To make CP's in the ratio 1 : 1 : 2

First makes CP's equal

For this, LCM of 10, 16, 4 = 80

	CP		SP	CP	SP
Apple	10	$\times 8$	16 $\times 8$	80	128
Orange	16	$\times 5$	12 $\times 5 \Rightarrow 80$	80	60
Mango	4	$\times 20$	6 $\times 20$	80	120

Now divide CPs in the ratio

= 1 : 1 : 2

CP	SP
Apple	80 $\times 1 = 80$ 128 $\times 1 = 128$
Orange	80 $\times 1 = 80$ 60 $\times 1 = 60$
Mango	80 $\times 1 = 160$ 120 $\times 2 = 240$

$\therefore$ CP of (1 Apple + 2 oranges + 2 mangoes) = $80 + 80 \times 2 + 160 \times 2$
= Rs. 560

& SP of (1 Apple + 2 oranges + 2 mangoes)
= $128 + 60 \times 2 + 240 \times 2$
= Rs. 728

$\therefore$ Net profit % = $\frac{728 - 560}{560} \times 100$

= $\frac{168}{560} \times 100 = 30\%$

588. The evergreen shrubs at Ravi's nursery are planted in rows on a square plot of land measuring 2,401 square ft. The shrubs are planted in such a manner that the centre of the shrubs are 7 ft apart and the outer shrubs are planted along the edges of the plot, with a shrub at each corner. Ravi spent \$ 896 to cover all the costs necessary for raising this crop of the evergreen shrubs. If Ravi

succeeds in selling each shrub for \$ 35, his profit will be what percentage of his total cost ?

- (a) 100 % (b) 125 %
(c) 50 % (d) 150 %

Sol. (d) By finding the square root of 2401, you can determine that the plot of land measure 49 ft $\times$ 49 ft.

With shrubs planted along the edges and the corner of the plot, with 7 ft between each shrub, there is room for 8 rows, each with 8 shrubs, for a total of 64 shrubs.

So, Ravi's total selling price = $64 \times 35 = \$ 2240$

His profit equals the total selling price minus the total cost to produce the shrubs. So Ravi's profit will be

$\$ 2240 - \$ 896 = \$ 1344$

$\therefore$ Profit % = $\frac{1344}{896} \times 100 = 150\%$

589. The cost of setting up the type of a magazine is Rs. 1000. The cost of running the printing machine is Rs. 120 per 100 copies. The cost of paper, ink and so on is 60 paise per copy. The magazines are sold at Rs. 2.75 each. 900 copies are printed, but only 784 copies are sold. What is the sum to be obtained from advertisements to give a profit of 10 % on the cost?

- (a) Rs. 730 (b) Rs. 720
(c) Rs. 726 (d) Rs. 736

Sol. (c) Total C.P.

= $100 + 120 \times 9 + 900 \times \frac{60}{100}$
= $1000 + 1080 + 540 = 2620$
C.P. = 2620

Profit = 10 % = $\frac{1}{10} \rightarrow$ Profit

S.P. = $2620 \times \frac{11}{10} = 2882$

but only 784 copies are sold each for 2.75

total received amount

= $784 \times 2.75 = 2156$

Sum to be obtained

= $2882 - 2156 = 726$

590. A tradesman fixed his selling price of goods at 30 % above the cost price. He sells half the stock at this price, one-quarter of his stock at a discount of 15 % on the original selling price and rest at a discount of 30 % on the original selling price. Find the gain percent altogether :

- (a) 14.875 % (b) 15.375 %
(c) 15.575 % (d) 16.375 %

Sol. (b) C.P. : S.P.

100 : 130
10 : 13

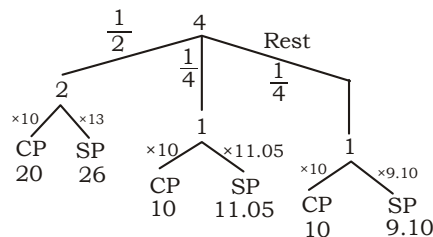
Let total stock = 4kg

Selling price after giving 15% discount for $\frac{1}{4}$ th part

= $13 \times \frac{85}{100} = 11.05$

Selling price after giving 30% discount for the rest part

= $13 \times \frac{70}{100} = 9.10$



Total CP = $20 + 10 + 10 = 40$

Total SP = $26 + 11.05 + 9.10 = 46.15$

Profit % = $\frac{6.15}{40} \times 100 = 15.375\%$

591. A dishonest dealer marks up the price of his goods by 20 % and gives a discount of 10 % to the customer. He also uses a 900 gram weight instead of a 1 kilogram weight. Find his percentage profit due to these maneuvers :

- (a) 8 % (b) 12 %
(c) 20 % (d) 16 %

Sol. (a) Let CP = 100

Then MRP will be 120

SP after giving 10 % discount

= $120 \times \frac{9}{10} = 108$



Let CP of 1 gram = Rs. 100

Then CP of 900g. = 90000

But he receives money for 1000g. = $1000 \times 108 = 108000$

$$\text{Profit \%} = \frac{18000}{90000} \times 100 = 20 \%$$

592. Dev bought 100 kg of rice for Rs. 1100 and sold it at a loss of as much money as he received for 20 kg rice. At what price did he sell the rice ?

- (a) Rs. 9 per kg
(b) Rs. 9.1666 per kg
(c) Rs. 9.5 per kg
(d) Rs. 10.33 per kg

Sol. (b) CP of 100 kg = SP of 120 kg

CP : SP

$$120 : 100 = \frac{1}{6} \times 100$$

$$\text{Loss} = 16\frac{2}{3} \%$$

$$\begin{array}{c|c} \text{CP} & \text{SP} \\ \hline 6 & 5 \\ \times \frac{11}{6} & \times \frac{11}{6} \\ \hline 11 & \frac{55}{6} \end{array}$$

$$\text{S.P.} = 9.166$$

593. A shopkeeper calculates percentage profit on the buying price and another on the selling price. What will be their difference in profits if both claim a profit of 20 % on goods sold for Rs. 3000 ?

- (a) Rs. 200 (b) Rs. 100
(c) Rs. 400 (d) Rs. 150

Sol. (b)

A (on C.P.)		B (on S.P.)	
CP	SP	CP	SP
100	120	80	100
$\times 25$	$\times 25$	$\times 30$	$\times 30$
2500	3000	2400	3000
P = 500		P = 600	

difference in profit = 100

594. A merchant makes a profit of 20 % by selling an article. What would be the percentage change in the profit percent had he paid 10 % less for it and the customer paid 10 % more for it?

- (a) 120 % (b) 125 %
(c) 133.33 % (d) 150 %

Sol. (c)

$$\begin{array}{c} \text{CP : SP} \\ 100 : 120 \\ 10 \% (-) \left(\begin{array}{c} 100 \\ 90 \end{array} \right) 10 \% (+) \left(\begin{array}{c} 120 \\ 132 \end{array} \right) \\ \frac{42}{90} \times 100 = \frac{420}{9} \% \\ \frac{420}{9} - 20 \\ \text{\% Change} = \frac{20}{9} \times 100 \\ = \frac{240}{9} \times 100 = \frac{400}{3} = 133.33\% \end{array}$$

595. David sells his Laptop to Goliath at a loss of 20 % who subsequently sells it to Hercules at a profit of 25 %. Hercules, after finding some defect in the laptop, returns it to Goliath but could recover only Rs. 4.50 for every Rs. 5 he had paid. Find the amount of Hercules' loss if David had paid Rs. 1.75 lakh for the laptop :

- (a) Rs. 3500
(b) Rs. 2500
(c) Rs. 17,500
(d) None of these

Sol. (c) Hercules' loss %

$$= \frac{50000}{500000} \times 100 = 10 \%$$

David	Goliath	Hercules
100	80	100
$\downarrow$	$\uparrow$	$\downarrow$
175000	100 R = 175000	10 R = 17500

20 % (-) 25 % (+) 10 % (-)

596. A dishonest shopkeeper, at the time of selling and purchasing, weighs 10 % less and 20 % more per kilogram respectively. Find the percentage profit earned by treachery. (Assuming he sells at Cost price)

- (a) 30 % (b) 20 %
(c) 25 % (d) 33.33 %

Sol. (d) He gives 900gm at the time of selling

but he takes 1200 at time of buying

$$\therefore \text{CP} = \text{SP}$$

$$\text{CP} = 900$$

$$\text{SP} = 1200$$

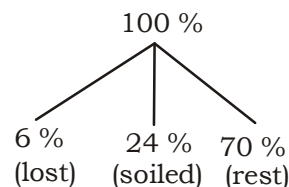
$$\frac{300}{900} \times 100 = 33\frac{1}{3} \%$$

597. A dealer marks articles at a price that gives him profit of 30 %. 6 % of the consignment of goods was lost in a fire in his premises, 24 % was soiled and had to be sold at half the cost price. If the remainder was sold at the marked price, what percentage profit or loss did the dealer make on that consignment ?

- (a) 2 % (b) 2.5 %
(c) 3 % (d) 6.2 %

Sol. (c) Let CP = 10

MRP will be = 13



$$\text{total cost price} = 100 \times 10 = 1000$$

$$\text{total SP} = 24 \times 45 = 120$$

$$= 70 \times 13 = 910 = 1030$$

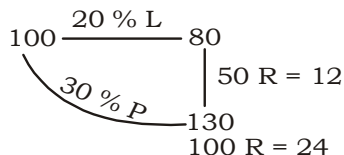
$$\text{Profit} = \frac{30}{1000} \times 100 = 3 \%$$

598. A book was sold for a certain sum and there was a loss of 20%. Had it been sold for Rs. 12 more, there would have been a gain of 30 %. What would be the profit if the book were sold for Rs. 4.8 more than what it was sold for ?

- (a) No profit, no loss
(b) 20 %
(c) 10 %
(d) 25 %



Sol. (a) Let CP = 100



CP = 24

$$SP = 24 \times \frac{4}{5} = 19.2$$

$$\text{New SP} = 19.2 + 4.8 = 24$$

So, no gain no loss

599. A driver of a autorickshaw makes a profit of 20 % on every trip when he carries 3 passengers and the price of petrol is Rs. 30 a litre. Find the percentage profit for the same journey if he goes for four passengers per trip and the price of petrol reduces to Rs. 24 a litre. (Assume that revenue per passenger is the same in both the cases.)

- (a) 33.33 %
 (b) 65.66 %
 (c) 100 %
 (d) Data inadequate

Sol. (c) His cost = 30 Rs.

$$\text{Profit} = 30 \times \frac{20}{100} = 6$$

From 3 passengers he gets Rs. 36
 From 4 passengers he will

$$\text{get } \frac{36}{3} \times 4 = 48$$

his new cost = 24

$$\text{new P \%} = \frac{24}{24} \times 100 = 100 \%$$

600. Raghav bought 25 washing machines and microwave ovens for Rs. 2,05,000. He sold 80 % of the washing machines and 12 microwave ovens for a

profit of Rs. 40,000. Each washing machine was marked up by 20 % over cost and each microwave oven was sold at a profit of Rs. 2,000. The remaining washing machines and 3 microwave ovens could not be sold. What is Raghav's overall profit/loss ?

- (a) Rs. 1000 profit
 (b) Rs. 2500 loss
 (c) Rs. 1000 loss
 (d) Cannot be determined

Sol. (c) Total sold microwaves and washing machines are 80 % of the total quantity

CP of 80 % quantity

$$= 205000 \times \frac{4}{5} = 164000$$

Profit gain = 40,000

Amount receive

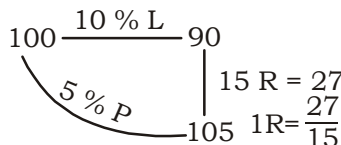
$$= 164000 + 40000 = 204000$$

Loss = 1000

601. After selling a watch, Shyam found that he had made a loss of 10 %. He also found that had he sold it for Rs. 27 more, he would have made a profit of 5 %. The actual initial loss was what percentage of the profit earned, had he sold the watch for a 5 % profit ?

- (a) 23 % (b) 150 %
 (c) 200 % (d) 180 %

Sol. (c) Let CP = 100



$$\text{Loss} = \frac{27}{15} \times 10 = 18$$

$$\text{Profit} = \frac{27}{15} \times 5 = 9$$

$$9 \times \frac{x}{100} = 18$$

$$x = 200 \%$$

602. Sambhu buys rice at Rs. 10/kg and puts a price tag on it so as to earn a profit of 20 %. However, his faulty balance

shows 1000 gm when it is actually 800 gm. What is his actual gain percentage ?

- (a) 50 % (b) 40 %
 (c) 18 % (d) 10 %

Sol. (a) CP = 10 Rs/kg

Profit = 20 %

$$SP = 10 \times \frac{120}{100} = 12$$

He gives 800g in place of 1000g

$$CP = 10 \times 800 = 8000$$

$$SP = 12 \times 1000 = 12000$$

$$\text{Profit} = \frac{4000}{8000} \times 100 = 50\%$$

603. The profit earned when an article is sold for Rs. 800 is 20 times the loss incurred when it is sold for Rs. 275. At what price should the article be sold if it is desired to make a profit of 25 %:

- (a) Rs. 300 (b) Rs. 350
 (c) Rs. 375 (d) Rs. 400

Sol. (c) $(800 - x) = 20(x - 275)$

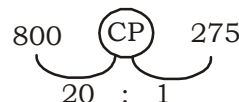
$$800 - x = 20x - 5500$$

$$21x = 6300$$

$$x = 300$$

$$SP = 300 \times \frac{125}{100} = 375$$

Alternatively:-



$$525 \times \frac{20}{21} = 500$$

$$CP = 800 - 500 = 300$$

$$SP = 300 \times \frac{125}{100} = 375$$

604. A sells to B goods at five-thirds the rate of profit at which B has decided to sell it to C. C, on other hand, sells it to D at one-third the rate of profit at which B sold it to C. If D gives Rs. 2145 to C at 10 % profit, how much did A buy it for ?

- (a) Rs. 1000 (b) Rs. 2000
 (c) Rs. 1500 (d) Rs. 1800



Sol. (a) C gets 10 % profit and sells for 2145

then B will get = 30 %

A will get = 50%

$$A \times \frac{3}{2} \times \frac{13}{10} \times \frac{11}{10} = 2145$$

A = 1000 Rs.

605. A dishonest trader marks up his goods by 80 % and gives discount of 25 %. Besides he gets 20 % more amount per kg from wholesaler and sells 10 % less per kg to customer. What is the overall percentage?

- (a) 80 %
(b) 60 %
(c) 70 %
(d) none of these

Sol. (a)

CP	:	MRP
100	:	180
25 % (discount)		
SP	=	135
CP	:	SP
100	:	135
20	:	27

he sells 10 % less and takes 20 % more

Sells	:	Takes
90	:	120
3	:	4

$$CP = 3 \times 20 = 60$$

$$SP = 4 \times 27 = 108$$

$$\text{Profit \%} = \frac{48}{60} \times 100 = 80\%$$

606. A dishonest dealer purchases goods at 20 % discount of the cost price of Rs x and also cheats his wholesaler by getting 20 % extra through false weighing, per kg. Then he marks up his goods by 80 % of x , but he gives a discount of 25 %

besides he cheats his customer by weighing 10 % less than the required. What is his overall profit percentage ?

- (a) 125 % (b) 100 %
(c) 98.66 % (d) 120 %

Sol. (a) Let $x = 100 = CP$

$$CP = 100$$

$$MRP = 180$$

$$CP \text{ for dealer} = 80$$

also get 20 % more and give 10 % less

Gets	:	Gives
120	:	90
4	:	3

$$\text{His CP} = 3 \times 80 = 240$$

$$SP = 4 \times 135 = 540$$

$$\text{Profit \%} = \frac{300}{240} \times 100 = 125 \%$$

607. Profit on selling 10 candles is equals to selling price of 3 pens. While loss on selling 10 pens is equals to selling price of 4 candles. Also profit percentage is equals to the loss percentage and cost of a candle is half of the cost of a pen. What is the ratio of selling price of candle to the selling price of a pen?

- (a) 5 : 4 (b) 3 : 2
(c) 4 : 5 (d) 3 : 4

Sol. (b)

Candles	:	Pens
CP	:	x
SP	:	$2x$
	:	a
	:	b

According to the question,

$$\frac{3b}{10x} \times 100 = \frac{4a}{20x} \times 100$$

$$6b = 4a$$

$$a : b$$

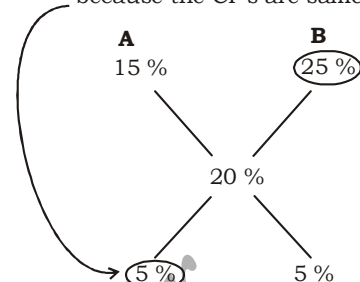
$$3 : 2$$

608. Cost price of two motorcycles is same. One is sold at a profit of 15 % and the other for Rs. 4800 more than the first. If the net profit is 20 %. Find the cost price of each motorcycle :

- (a) Rs. 48000 (b) Rs. 52000
(c) Rs. 36000 (d) Rs. 42500

Sol. (a)

because the CP's are same



So,

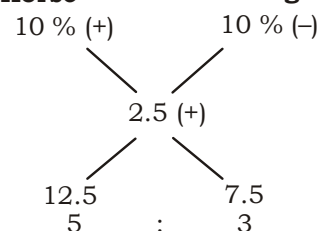
SP	CP
A	100
115	
B	100
125	
10 R	= 4800
100 R	= 48000

609. A horse and a carriage together cost Rs. 8,000. If by selling the horse at a profit of 10 % and the carriage at a loss of 10 % a total profit of 2.5 % is made, then what is the cost price of the horse ?

- (a) Rs. 3,000 (b) Rs. 3,500
(c) Rs. 4,000 (d) Rs. 5,000

Sol. (d) Horse

Carriage



$$CP \text{ of Horse} = 8000 \times \frac{5}{8} = 5000$$

610. The sale price of an article including the sales tax is Rs. 616. The rate of sales tax is 10 %. If the shopkeeper has made a profit of 12 %, then the cost price of the article is:

- (a) Rs. 500 (b) Rs. 515
(c) Rs. 550 (d) Rs. 600

Sol. (a)

CP	:	SP
100	:	112
25	:	28
$\times 22$		
550	:	616



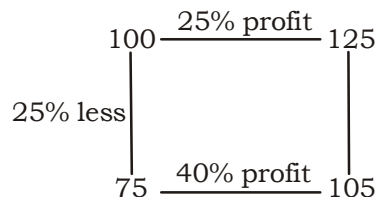
Sales tax = 10 %

$$\text{Real CP} = \frac{550}{110} \times 100 = 500$$

611. A shopkeeper sells a pair of sunglasses at a profit of 25 %. If he had bought it at 25 % less and sold it for Rs. 10 less, then he would have gained 40 %. Determine the cost price of the pair of sunglasses :

- (a) Rs. 50 (b) Rs. 25
(c) Rs. 75 (d) Rs. 60

Sol. (a) Let CP = 100



$$20 R = 10$$

$$1 R = \frac{1}{2}$$

$$\text{CP} = 100 \times \frac{1}{2} = 50 \text{ Rs}$$

612. Vineet calculates his profit percentage on the selling price whereas Roshan calculates his profit on the cost price. They find that the difference of their profits is Rs. 275. If the selling price of both of them are the same, and Vineet gets 25 % profit and Roshan gets 15 % profit, then find their selling price :

- (a) Rs. 2,100 (b) Rs. 2,300
(c) Rs. 2,350 (d) Rs. 2,250

Sol. (b)

Vineet		Roshan	
CP	SP	CP	SP
75	100	100	115
3×23	4×23	20×4	23×4
69	92	80	92

$$\text{Profit of Vineet} = 23$$

profit of Roshan = 12

difference = 11 R = 275

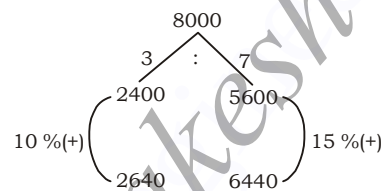
$$\text{SP} = 92R = \frac{275}{11} \times 92 = 2300$$

613. A contractor thinks by doing a work he will earn rupees 8400. In the earning there is 5 % profit, labouring and raw material are included. The ratio between raw material and labouring is 3 : 7. When he starts working he finds that the cost of raw material and labouring is increased by 10 % and 15 % respectively. Now find his loss % :

- (a) 6.5 % (b) 7 %
(c) 7.49 % (d) 8.3 %

Sol. (d) Profit = 5 %

$$\text{Total CP} = (L + C) = \frac{8400}{105} \times 100$$



$$\text{New C.P.} = 2640 + 6440 = 9080$$

$$\text{SP} = 8400$$

$$\text{Loss \%} = \frac{680}{9080} \times 100 = \frac{1700}{227} = 4.9 \%$$

614. If I sell one horse for rupees 3100 and a cow for rupees 1300, there is a profit of 10%. But if I sell horse for rupees 3150 and cow at cost price I suffer loss of 10 %. Find the difference between cost price of horse and cow :

- (a) 2950 (b) 3200
(c) 3150 (d) 3100

Sol. (d) Total S.P.

$$= 3100 + 1300 = 4400$$

$$\text{Profit \%} = 10 \%$$

$$\text{CP of H + B} = 4000$$

$$\text{Loss of 10 \%} = 400$$

$$\text{Then SP of Horse} = 3150 + 400$$

$$\text{CP of Horse} = 3550$$

$$3550 + B = 4000$$

$$\text{CP of B} = 450$$

difference in CP of H and B

$$= 3550 - 450 = 3100$$

615. In a cricket match a contractor signs a contract of giving food for 24 players and decides to take a profit of $12\frac{1}{2}\%$ on the cost of food. 3 players found absent and remaining paid their bill. But a contractor suffers a loss of 30 rupees. Find the money which is paid by a player :

- (a) 75 (b) 80
(c) 100 (d) 90

Sol. (d) $P = 12\frac{1}{2}\% = \frac{1}{8}$

CP	SP
8	9

$$\text{LCM} = 72 \text{ (total player} = 24)$$

$$64 : 72$$

$$24 \text{ player pays } 72$$

$$\text{So, 21 will pay} = 63$$

New

CP	SP
64	63

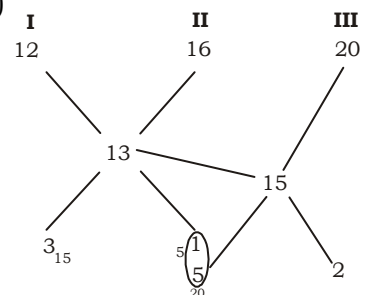
$$1 R = 30$$

$$1 \text{ player pays} = \frac{63 \times 30}{21} = 90$$

616. A man has 560 pens. He divides them in three parts so that he gains 12 %, 16 % and 20 %. If he gains 13 % from the first two parts and his over all profit is 15 %. Then the no. of pens in third part:

- (a) 140 (b) 160
(c) 150 (d) 180

Sol. (b)



I	II	III
15	5	8

$$28 R = 560$$

$$8 R = 20 \times 8 = 160$$



Exercise

1. A man buys a shirt and a trouser for ₹371. If the trouser costs 12% more than the shirt, find the cost of the shirt
(a) ₹ 125 (b) ₹ 150
(c) ₹ 175 (d) ₹ 250
2. A shopkeeper sells two items at the same price. If he sells one of them at a profit of 10% and the other at a loss of 10%, find the percentage profit/loss
(a) 1% loss
(b) 1% profit
(c) 10% loss
(d) None of these
3. By selling 15 mangoes, a fruit vendor recovers the cost price of 20 mangoes. Find the profit percentage.
(a) $22\frac{1}{2}\%$ (b) $33\frac{1}{3}\%$
(c) $11\frac{1}{2}\%$ (d) $12\frac{1}{2}\%$
4. A dishonest shopkeeper uses a 900 gram weight instead of 1 kilogram weight. Find his profit percent if he sells per kilogram at the same price as he buys a kilogram.
(a) $11\frac{1}{9}\%$ (b) $11\frac{2}{9}\%$
(c) $12\frac{1}{2}\%$ (d) None of these
5. A manufacturer makes a profit of 15% by selling a colour TV for ₹ 6900. If the cost of manufacturing increases by 30% and the price paid by the retailer is increased by 20% find the profit percent made by the manufacturer.
(a) 6%
(b) 6.43%
(c) 6.15%
(d) None of these
6. Find a single discount equal to three consecutive discounts of 10%, 12% and 5%.
(a) 24.76%
(b) 25.76%
(c) 28.76%
(d) None of these
7. Rakesh Yadav bought an article and spent ₹110 on its repairs. Then he sold it to Bhuvnesh at a profit of 20% Bhuvnesh sold it to Charan at a loss of 10%. Charan finally sold it for ₹1188 at a profit of 10%. How much did Rakesh Yadav pay for the article.
(a) ₹ 890 (b) ₹ 1000
(c) ₹ 780 (d) ₹ 840
8. A dishonest businessman professes to sell his articles at cost price but he uses false weights with which he cheats by 10% while buying and by 10% while selling. Find his percentage profit.
(a) $22\frac{2}{9}\%$ (b) $12\frac{1}{2}\%$
(c) $8\frac{1}{3}\%$ (d) None of these
9. Rakesh Yadav bought some oranges from Nagpur for Rs. 32. He has to sell it in Delhi. He is able to sell off all the oranges in Delhi and on reflection finds that he has made a profit equal to the cost price of 40 oranges. how many oranges did Rakesh Yadav buy ?
(a) 32
(b) 16
(c) 64
(d) Data Inadequate
10. By selling 5 articles for Rs. 15, a man makes a Profit of 20%. Find his gain or loss percentage if he sells 8 articles for Rs. 18.4 ?
(a) 8% loss (b) 10% profit
(c) 8% profit (d) None of these
11. A shopkeeper allows a rebate of 25% to the buyer. He sells only smuggled goods and as a bribe he pays 10% of the cost of the article. If his cost price is Rs. 2500, then find what should be the marked price if he desires to make a profit of 9.09%.
(a) 2000 (b) 4000
(c) 1000 (d) 5000
12. A man sells three articles, one at a loss of 10% another at a profit of 20% and the third one at a loss of 25%. If the selling price of all the three is the same, find by how much percent is their average CP lower than or higher than their average SP.
(a) 9.256 higher
(b) 8.256 higher
(c) 9.256 lower
(d) 8.256 lower
13. A shopkeeper sold goods for Rs. 2400 and made a profit of 25% in the process. Find his profit per cent if he had sold his goods for Rs. 2040.
(a) 6.25% (b) 7%
(c) 6.20% (d) 6.5%
14. A digital diary is sold for Rs. 935 at a profit of 10%. What would have been the actual profit or loss on it, if it had been sold for Rs. 810?
(a) Rs. 45 (b) Rs. 40
(b) Rs. 48 (c) Rs. 50
15. A music system when sold for Rs. 4500 gives a loss of 16.66% to the merchant who sells it. Calculate his loss or gain per cent, if he sells it for Rs. 5703.75.
(a) Loss of 5.625%
(b) Profit of 8.33%
(c) Loss of 7%
(d) profit of 5.625%
16. By selling bouquets for Rs. 63 a florist gains 5%. At what price should he sell the bouquets to gain 10% on the cost price?
(a) Rs. 66 (b) Rs. 69
(c) Rs. 72 (d) Rs. 72.50



17. A shopkeeper bought 240 chocolates at Rs.9 per dozen. if he sold all of them at Rs. 1 each what was his profit per cent?
 (a) $66\frac{1}{6}\%$ (b) $33\frac{1}{3}\%$
 (c) 24% (d) 27%
18. A feeding bottle is sold for Rs120. Sales tax accounts for one-fifth of this and profit one third of the remainder .Find the cost price of the feeding bottle.
 (a) Rs. 64 (b) Rs. 72
 (c) Rs. 68 (d) Rs. 76
19. The marked price of a table is Rs.1200, which is 20% above the cost price. It is sold at a discount of 10% on the marked price. Find the profit per cent.
 (a) 10% (b) 8%
 (c) 7.5% (d) 6%
20. 125 toffees cost Rs. 75. Find the cost of one million toffees if there is a discount of 40% on the selling price for this quantity.
 (a) Rs. 300,000
 (b) Rs. 3,20,000
 (c) Rs. 3,60,000
 (d) Rs. 4,00,000
21. A shopkeeper marks the price of an article at Rs. 80 Find the cost price if after allowing a discount of 10% he still gains 20% on the cost price.
 (a) Rs. 53.33 (b) Rs. 70
 (c) Rs. 75 (d) Rs. 60
22. In Question 21 what will be the selling price of the article if he allows two successive discount of 5% each?
 (a) Rs. 72 (b) RS. 72.20
 (c) Rs. 75 (d) Rs. 71.66
23. A dozen pairs. of gloves quoted at Rs. 80 are available at a discount of 10%. Find how many pairs. of gloves can be bought for Rs. 24.
 (a) 4 (b) 5
 (c) 6 (d) 8
24. The printed price of a calculator is Rs. 180. A retailer pays Rs. 137.7 for it by getting successive discount of 10% and another rate which is illegible. what is the second discount rate?
 (a) 12% (b) 12.5%
 (c) 15% (d) 20%
25. How much percent more than the cost price should a shopkeeper mark his goods, so that after allowing a discount of 12.5% he should have a gain of 5% on his outlay?
 (a) 9.3675 (b) 16.66%
 (c) 20% (d) 25%
26. In order to maintain the price line, a trader allows a discount of 10% on the marked price of goods in his shop. However, he still makes a gross profit of 17% on the cost price. Find the profit percent he would have made on the selling price had he sold at the marked price.
 (a) 23.07% (b) 30%
 (c) 21.21% (d) 25%
27. A wholeseller allows a discount of 20% on the list price to retailer. The retailer sells at 5% discount on the list price.If the customer paid Rs. 38 for an article, what profit is made by the retailer?
 (a) Rs. 10 (b) Rs. 8
 (c) Rs. 6 (d) Rs. 12
28. The cost of production of a cordless phone set in 2011 is Rs.900 , divided between material, labour and overheads in the ratio 3:4:2. If the cordless phone set is marked at a price that gives a 20% profit on the component of price accounted for by labour, what is the marked price of the set?
 (a) Rs.980 (b) Rs.1080
 (c) Rs.960 (d) Rs.1020
29. A man sells 5 articles for Rs. 15 and makes a profit of 20% Find his gain or loss percent if he sells 8 such articles for Rs. 16.
 (a) 2.22% loss (b) 2.22% profit
 (c) 20% loss (d) 8% profit
30. A owns a house worth Rs.10,000. He sells it to B at a profit of 15%. After sometime, B sells it back to A at loss15%. Find A's loss or gain percent.
 (a) 2.25% gain
 (b) 6.25% gain
 (c) 17.64% gain
 (d) 17.25% gain
31. A make an article for Rs. 120 and sells it to B at a profit of 25%. B sells it to C who sells it for Rs. 198, making a profit of 10% what porfit percent did B make?
 (a) 25% (b) 20%
 (c) 16.66% (d) 15%
32. A man buys 50 kg of oil at Rs. 10 per kilogram and another 40kg of oil at Rs.12 kg. and mixes them. He sells the mixture at the rate of Rs. 11 per kilogram. What will be his gain percent if he is able to sell the whole lot ?
 (a) $\frac{100}{98}\%$
 (b) $100(10/49)\%$
 (c) $10(1/49)\%$
 (d) None of these
33. A shopkeeper sells sugar in such a way that the selling price of 950 gm is the same as the cost price of one kilogram. Find his gain percent.
 (a) $100/17\%$ (b) $150/17\%$
 (c) $5(5/19)\%$ (d) $1/19\%$
34. A dealer buys eggs at Rs.36 per gross. He sells the eggs at a profit of $12\frac{1}{2}\%$ on the cost price what is the selling price per egg (apoximately)?
 (a) 33 paise (b) 30 paise
 (c) 29 paise (d) 28 paise
35. A sold a table to B at a profit of 20%. B sold the same table to C for Rs. 75 thereby making a profit of 25% Find the price at which A bought the table from X if it is known that X gained 25% in the transaction.
 (a) Rs. 30 (b) Rs. 40
 (c) Rs. 50 (d) Rs. 60
36. A sold a table to B at a profit of 15%. Later on, B sold it back to A at a profit of 20%, thereby gaining Rs. 69. How much did A pay for the table originally?
 (a) Rs. 300 (b) Rs. 320
 (c) Rs. 345 (d) Rs. 350



37. A man sells a TV set for Rs.3450 and makes a profit of 15%. He sells another TV at a loss of 10%. If on the whole, he neither gain nor losses, find the selling price of the second TV set.
(a) Rs. 4000 (b) Rs. 4400
(c) Rs. 4050 (d) Rs. 4500
38. A man sells an article at 5% above its cost price. If he had bought it at 5% less than what he paid for it and sold it for Rs. 2 less, he would have gained 10%. Find the cost price of the article.
(a) Rs. 500 (b) Rs. 360
(c) Rs. 425 (d) Rs. 400
39. A briefcase was sold at a profit of 10%. If its cost price was 5% less and it was sold for Rs.7 more the gain would have been 20%. Find the cost price of the briefcase.
(a) Rs. 175 (b) Rs. 200
(c) Rs. 225 (d) Rs. 160
40. A man buys two cycles for a total cost of Rs. 900. By selling one for $\frac{4}{5}$ of its cost and other for $\frac{5}{4}$ of its cost, he makes a profit of Rs. 90 on the whole transaction. Find the cost price of lower priced cycle.
(a) Rs. 360 (b) Rs. 250
(c) Rs. 300 (d) Rs. 420
41. A merchant bought two laptops, Which together cost him Rs.480. He sold one of them at a loss of 15% and other at a gain of 19%. If the selling price of both the laptops are equal, find the cost of the lower priced laptop.
(a) Rs. 300 (b) Rs. 180
(c) Rs. 200 (d) Rs. 280
42. A manufacturer makes a profit of 15% by selling a colour TV for Rs.5750. If the cost of manufacturing increases by 30% and the price paid by the retailer is increased by 20%, find the profit percent made by the manufacturer.
(a) $6\frac{2}{13}\%$ (b) $4\frac{8}{13}\%$
(c) $6\frac{1}{13}\%$ (d) $7\frac{4}{13}\%$
43. The cost of manufacturing an article is made up of materials, labour and overheads in the ratio 4 : 3 : 2. If the cost of labour is Rs. 45, find the profit percent if the article is sold for Rs. 180.
(a) 50% (b) 33.33%
(c) 25% (d) 20%
44. Two dealers, X and Y selling the same model of hp printer mark them under the same selling prices. X gives successive discounts of 25% and 5% and Y gives successive discounts of 16% and 12%. From whom is it more profitable to purchase the printer.
(a) From Y
(b) From X
(c) indifferent between the two
(d) Cannot be determined
45. A sells a car priced at Rs. 36,000. He gives a discount of 8% on the first Rs. 20,000 and 5% on the remaining Rs.16,000. His competitor B sells a car of the same marked, price at Rs. 36,000. If he wants to be competitive what percent discount should B offer on the marked price.
(a) 5% (b) 5.5%
(c) 6.67% (d) 8.33%
46. An article cost Rs. 700 to a manufacturer who lists its price at Rs. 800. He sells it to a trader at a discount of 5%. The trader gets a further discount of 5% on his net payment for paying in cash. Calculate the amount that the trader pays to the manufacturer.
(a) Rs. 722
(b) Rs. 720
(c) Rs. 725
(d) None of these
47. A watch dealer pays 10% custom duty on a watch that cost Rs. 250 abroad. For how much should he mark it, if he desires to make a profit of 20% after giving a discount of 25% to the buyer?
(a) Rs. 400 (b) Rs. 440
(c) Rs. 275 (d) Rs. 330
48. A shopkeeper buys an article for Rs. 400 and marks it for sale at a price that gives him 80% profit on his cost. He, however allows a 15% discount on the marked price to his customer. Calculate the actual percentage profit made by the shopkeeper.
(a) 62% (b) 64%
(c) 53% (d) 54%
49. In the land of the famous milkman Bhuvnesh a milkman sells his buffalo for Rs. 720 at some profit. Had he sold his buffalo at Rs. 510, the quantum of the loss incurred would have been double that of the profit earned what is the cost price?
(a) Rs. 600 (b) Rs. 625
(b) Rs. 675 (d) Rs. 650
50. A trader purchases apples at Rs. 60 per hundred. He spends 15% on the transportation, what should be the selling price per 100 to earn a profit of 20%?
(a) Rs. 72 (b) Rs. 81.8
(c) Rs. 82.8 (d) Rs. 83.8
51. A dishonest dealer professes to sell at cost price but uses a 900 gram weight instead of a 1 kilogram weight. Find the percent profit to the dealer.
(a) 10% (b) 11.11%
(c) 12.5% (d) None of these
52. Bhuvnesh makes 750 articles at a cost of 60 paise per article. He fixed the selling price such that if only 600 articles are sold, he would have made profit of 40% on the outlay. However, 120 articles got spoilt and he was able to sell 630 articles at this price. Find his actual profit percent as the percentage of total outlay assuming that the unsold articles are useless.
(a) 42% (b) 53%
(c) 47% (d) 46%
53. A manufacturer estimates that on inspection 12% of the articles he produces will be rejected. He accepts an order to supply 22,000 articles at Rs.7.50 each. He estimates the profit on his outlay including the manufacturing of rejected articles, to be 20%. Find the cost of manufacturing each article.



- (a) Rs. 6 (b) Rs. 5.50
(c) Rs. 5 (d) Rs. 4.50
54. The cost of setting up the type of a magazine is Rs. 1000. The cost of running the printing machine is Rs. 120 per 100 copies. The cost of paper, ink and so on is 60 paise per copy. The magazines are sold at Rs. 2.75 each. 900 copies are printed, but only 784 copies are sold. What is the sum to be obtained from advertisements to give a profit of 10% on the cost?
- (a) Rs. 730 (b) Rs. 720
(c) Rs. 726 (d) Rs. 736
55. A tradesman fixed his selling price of goods at 30% above the cost price. He sells half the stock at this price, one-quarter of his stock at a discount of 15% on the original selling price and rest at a discount of 30% on the original selling price. Find the gain percent altogether.
- (a) 14.875% (b) 15.375%
(c) 15.575% (d) 16.375%
56. A tradesman marks an article at Rs. 205 more than the cost price. He allows a discount of 10% on the marked price. Find the profit percent if the cost price is Rs. x .
- (a) $\frac{\left[\frac{x}{(18450)} - 10\right]}{x}$
(b) $\frac{[(18450)10]x}{x}$
(c) $\frac{\left[\frac{x}{(18450)} - 100\right]}{x}$
(d) $\frac{\left[\frac{18450}{x} - 100\right]}{x}$
57. Tanu goes to a shop to purchase a doll priced at Rs. 400. She is offered 4 discount options by the shopkeeper. Which of these options should she opt for to gain maximum advantage of the discount offered?
- (a) Single discount of 30%
(b) 2 Successive discounts of 15% each
(c) 2 Successive discounts of 20% and 10%
(c) 2 Successive discounts of 20% and 12%
58. A dishonest dealer marks up the price of his goods by 20% and gives a discount of 10% to the customer. He also uses a Rs. 900 gram weight instead of a 1 kilogram weight. Find his percentage profit due to these maneuvers.
- (a) 8% (b) 12%
(c) 20% (d) 16%
59. A dishonest dealer marks up the price of his goods by 20% and gives a discount of 10% to the customer. Besides, he also cheats both his supplier and his buyer by 100 grams while buying or selling 1 kilogram. Find the percentage profit earned by the shopkeeper.
- (a) 20% (b) 25%
(c) 32% (d) 27.5%
60. For Question 59, if it is known that the shopkeeper takes a discount of 10% from his supplier and he disregards this discount while marking up (i.e. he marks up at the undiscounted price), find the percentage profit for the shopkeeper if there is no other change from the previous problem.
- (a) 32% (b) 36.66%
(c) 40.33% (d) 46.66%
61. Cheap and Best, a kirana shop bought some apples at 4 apple per rupee and an equal number at 5 apple per rupee. He then sold the entire quantity at 9 for 2 rupees. What is his percentage profit or loss?
- (a) 1.23% loss
(b) 6.66% Profit
(c) 8.88% loss
(d) No profit no loss
62. A watch dealer sells watches at Rs. 600 per watch. However, he is forced to give two successive discounts of 10% and 5% respectively. However, he recovers the sales tax on the net sale price from the customer at 5% of the net price. What price does a customer have to pay him to buy the watch?
- (a) Rs. 539.75 (b) Rs. 539.65
(c) Rs. 538.75 (d) Rs. 538.65
63. Rakesh Yadav bought 100 kg of rice for Rs. 1100 and sold it at a loss of as much money as he received for 20 kg rice. At what price did he sell the rice?
- (a) Rs. 9 per kg
(b) Rs. 9.1666 per kg
(c) Rs. 9.5 per kg
(d) Rs. 10.33 per kg
64. Find the change in the percentage profit for a fruit vendor who, after finding 20% of the fruits rotten increased his selling price by 10% over and above 15% that he was already charging?
- (a) -15 (b) +11.5
(c) -13.8 (d) -11.5
65. Find the selling price of goods if two salesmen claim to make 25% profit each, one calculating it on cost price while another on the selling price, the difference in the profits earned being Rs. 100 and selling price being the same in both the cases.
- (a) Rs. 2000 (b) Rs. 1600
(c) Rs. 2400 (d) Rs. 2500
66. A shopkeeper calculates percentage profit on the buying price and another on the selling price. What will be their difference in profits if both claim a profit of 20% on goods sold for Rs. 3000?
- (a) Rs. 200 (b) Rs. 100
(c) Rs. 400 (d) Rs. 150
67. A company made 3000 strips of tablets at a cost of Rs. 4800. The company gave away 1000 strips of tablets to doctors as free samples. A discount of 25% was



allowed on the printed price. Find the ratio of profits if the price is raised from Rs. 3.25 to Rs. 4.25 per strip and if at the latter price, samples to doctors were done away with. (New profit / old profit)

- (a) 55.5 (b) 63.5
(c) 75 (d) 99.25
68. A merchant makes a profit of 20% by selling an article. What would be the percentage change in the profit percent had he paid 10% less for it and customer paid 10% more for it?
- (a) 120% (b) 125%
(c) 133.33% (d) 150%
69. An article costing Rs. 20 was marked 25% above the cost price. After two successive discounts of the same percentage, the customer now pays Rs. 20.25 What would be the percentage change in profit had the price been increased by the same percentage twice successively instead of reducing it ?
- (a) 3600% (b) 3200%
(c) 2800% (d) 4000%
70. The accounts of a company show sales of Rs. 12,600. The primary cost is 35% of sales and trading cost accounts for 25% of the gross profit. Gross profit is arrived at by excluding the primary cost plus the cost of advertising expenses of Rs. 1400, director's salary of Rs. 650 per annum plus 2% of annual sales as miscellaneous cost. Find the percentage profit (approx) on a capital investment of Rs. 14,000?
- (a) 35%
(b) 31.54%
(c) 28%
(d) cannot be determined

71. Bhuvnesh has two cycles and one rickshaw. The rickshaw is worth Rs. 96. If he sells the rickshaw along with the first cycle, he has an amount double that of the value of the second cycle. But if he decides to sell the rickshaw along with the second cycle, the amount received would be less than the value of first cycle by Rs. 306. What is the value of first cycle?

- (a) Rs.900 (b) Rs.600
(c) Rs.498 (d) None of these
72. Rohit sells his laptop to Bhuvnesh at a loss of 20% who subsequently sells it to Manoj at a profit of 25% Manoj after finding some defect in the laptop, returns it to Bhuvnesh but could recover only Rs. 4.50 for every Rs. 5 he paid. Find the amount of Manoj loss if Rohit had paid Rs. 1.75 lakh for the laptop.
- (a) Rs.3500 (b) Rs.2500
(c) Rs.17,500 (d) None of these
73. A book was sold for a certain sum and there was a loss of 20%. Had it been sold for Rs.12 more, there would have been a gain of 30%. What would be the profit if the book were sold for 4.8 more than what it was sold for?
- (a) No profit, no loss
(b) 20%
(c) 10%
(d) 25%

For questions 76 to 79 use the following data:

74. Two thousand people lived in Business Village of which 55% were male and the rest were female. The male population earned a profit of 5% and the female population earned a profit of 8% on an investments of Rs. 50 each. Find the change in the percentage profit of the village if the ratio of male to female gets reversed the next year, population remaining the same.
- (a) Drop of 0.3%
(b) Increase of 0.3%
(c) Increase of 0.45%
(d) Drop of 0.45%

75. In Question 76, Find the change in the percentage profit of the village, if the population increases by 10%. (Assume the ratio remains the same).

- (a) Increase of 10%
(b) Increase of 11.11%
(c) No change
(d) Cannot be determined
76. For Question 77, find the percentage change in the profit.
- (a) Increase of 10%
(b) Increase of 11.11%
(c) No Change
(d) Cannot be determined
77. For Question 76, What would be the change in the percentage profit, if along with the reversal of the ratio of males to females, the profit also increases by 1% for both males and females?
- (a) Drop of 1.3%
(b) Increase of 1.3%
(c) Increase of 0.8%
(d) None of these
78. A rickshaw dealer buys 30 rickshaws for Rs. 4725. Of these, 8 are four-seaters. and the rest are two-seaters. At what price must he sell the four-seaters so that if he sells the two-seaters at $\frac{3}{4}$ th of this price, he makes a profit of 40% on his outlay ?
- (a) Rs. 180 (b) Rs. 270
(c) Rs. 360 (d) Rs. 450
79. A flat and a piece of land were bought by two friends Raghav and Sita respectively at prices of Rs. 2 lakh and Rs. 2.2 lakh. The price of the flat rises by 20 percent every year and that of land by 10% every year, After two years they decide to exchange their possessions. What is percentage gain of the gainer ?
- (a) 7.56%
(b) 6.36%
(c) 4.39%
(d) None of these



80. A, B and C form a company. A invests half of C expecting a return of 10%. B invests three-fourths of C, expecting a return of 15% on it. C invests Rs. 3000 and the profit of the firm is 25%. How much would B's share of profit be more than that of A's share if B gets an additional 8% for managing the business? (Assume that their expectations with respect to returns on capital invested are met before profit is divided in the ratio of capitals invested).
- (a) 20%
(b) 18%
(c) 15%
(d) Cannot be determined
81. Raghav bought 25 washing machines and microwave ovens for Rs. 2,05,000. He sold 80% of the washing machines and 12 microwave ovens for a profit of Rs. 40,000. Each washing machine was marked up by 20% over cost and each microwave oven was sold at a profit of Rs. 2,000. The remaining washing machines and 3 microwave ovens could not be sold. What is Raghav's overall profit/loss?
- (a) Rs. 1000 profit
(b) Rs. 2500 loss
(c) Rs. 1000 loss
(d) Cannot be determined
82. After selling a watch, Bhuvnesh found that he had made a loss of 10%. He also found that had he sold it for Rs. 27 more, he would have made a profit of 5%. The actual initial loss was what percentage of the profit earned had he sold the watch for a 5% profit?
- (a) 23%
(b) 150%
(c) 200%
(d) 180%
83. Rakesh Yadav buys rice at Rs. 10/kg. and puts a price tag on it so as to earn a profit of 20%. however, his faulty balance shows 1000 gm when it is actually 800gm. what is his actual gain percentage?
- (a) 50%
(b) 40%
(c) 18%
(d) 10%
84. A sells to B goods at five-thirds the rate of profit at which B has decided to sell it to C. C on other hand, sells it to D at one-third the rate of profit at which B sold it to C. if D gives Rs. 2145 to C at 10% profit, how much did A buy it for?
- (a) Rs. 1000
(b) Rs. 2000
(c) Rs. 1500
(d) Rs. 1800
85. In the town of Andher Nagari Chaupat Raja, shopkeepers have to buy and sell goods in the range of Rs. 500 to Rs. 999. A shopkeeper in such a town decides not to buy or sell the goods for amount that contain the digit 9 or for amounts that add up to 13 or are a multiple of 13. What is the maximum possible profit he can earn?
- (a) Rs. 388
(b) Rs. 389
(c) Rs. 488
(d) None of these
86. Rakesh Yadav bought a combined total of 25 monitors and printers. He marked up the monitors by 20% on the cost price, while each printer was marked up by Rs. 2000. He was able to sell 75% of the monitors and 2 printers and make a profit of Rs. 49,000. The remaining monitors and 3 printers could not be sold by him. Find his profit per monitor.
- (a) Rs. 3000
(b) Rs. 4000
(c) Rs. 2000
(d) data inadequate
87. An orange vendor makes a profit of 20% by selling oranges at a certain price. If he charges Rs. 1.2 higher per orange he would gain 40%. Find the original price at which he sold an orange.
- (a) Rs. 5
(b) Rs. 4.8
(c) Rs. 6
(d) None of these
88. A man sells his goods at 25% profit. Had he purchased it rupees 950 less and sold it rupees 950 less then he would gain 5% more profit. find the initial cost price?
- (a) Rs. 5700
(b) Rs. 5800
(c) Rs. 3800
(d) Rs. 4600
89. A man sells his goods at 30% profit. Had he purchased it Rs. 600 less and sold it rupees 600 less then he would gain 10% more profit find the initial CP?
- (a) Rs. 2400
(b) Rs. 3600
(c) Rs. 1200
(d) None of these
90. A man purchases some number of article at the rate of 5 articles for rupees 1 and same number of article at the rate of 4 in rupees 1 and he sells all the articles at the rate of 9 articles for rupees 2. During the whole process he bears a loss of rupees 30, then find the number of article that he purchase?
- (a) 10800
(b) 1080
(c) 12800
(d) 1680
91. A man purchases some articles at the rate of 2 in Rs. 1 and double the number of articles at the rate of 3 Rs. 1 and he sells all the articles at the rate of 4 in 1 rupee. During the whole process he bears a loss of rupees 45. find the number of article he purchase?
- (a) 324
(b) 325
(c) 326
(d) 327
92. A shopkeeper promise to sell his goods at $x\%$ profit but he uses 20% less weight and gains $37\frac{1}{2}\%$. find the value of x ?
- (a) 10%
(b) 20%
(c) 30%
(d) 40%
93. A man promise to sell his goods at $x\%$ loss but he use 25% less weight and thus gain 20%. find x ?
- (a) 10%
(b) 20%
(c) 30%
(d) 40%



94. A shopkeeper gives 1 article free at the purchase of 15 article and he also offer a discount of 4% to customer and he still gains 35% profit then find the ratio of cost price to mark price?
(a) 2 : 3
(b) 3 : 4
(c) 3 : 2
(d) None of these
95. A shopkeeper gives 4 articles free at the purchase of 12 articles and he also offer a discount of 20% to customer and he still gains 20% profit then find the ratio of their cost price and marked price?
(a) 1 : 2
(b) 2 : 1
(c) 3 : 1
(d) None of these
96. The total cost of 8 books and 5 pens is 92 then find the cost of 3 books and 2 pens if the cost of 5 books and 8 pens is 77?
(a) Rs. 35
(b) Rs. 45
(c) Rs. 27
(d) None of these
97. A man purchases a book and a pen for rupees 25000. He sold the book at 13% profit and pen at 17% profit. If he sold the book at 17% profit and pen at 13% profit he earns rupees 80 more
(i) find their individual cost prices
(ii) find the difference between the cost price?
(a) Rs. 13500, 11500, 2000
(b) Rs. 12000, 13000, 1000
(c) Rs. 16000, 9000, 7000
(d) None of these
98. A man sells a table at 12% loss and a book on 19% profit then he earns a profit of rupees 160 but if he sell the table at 12% profit and book at 16% loss then he bears a loss of 40 rupees. Find the price of book?
(a) Rs. 4000 (b) Rs. 3000
(c) Rs. 2000 (d) Rs. 3500
99. A man sells a table at 15% profit and chair at -12% loss then he earns a profit of 540 rupees and if he sell the table at 12% loss and chair at 15% profit then he bears no profit no loss then find the price of table and chair?
(a) Rs. 10000, Rs. 8000
(b) Rs. 12000, Rs. 6000
(c) Rs. 8000, Rs. 12000
(d) None of these
100. A man sells a book and a table at 13% and 9% profit respectively then he earns rupees 1060 but if he sells the book at $16\frac{2}{3}\%$ profit and table at $11\frac{1}{9}\%$ loss then bears no profit no loss. Find their CP ?
(a) Rs. 4000, Rs. 6000
(b) Rs. 5000 Rs. 5000
(c) Rs 3000, Rs. 7000
(d) None of these
101. A man sells two article for rupees 1710 if he sells the first article at 10% loss and 2nd article at 25% profit then find the amount of profit or loss in whole transaction ? If the cost price of first article is equal to selling price of 2nd article ?
(a) Rs. 90 profit
(b) Rs. 180 profit
(c) Rs. 95 profit
(d) None of these
102. If the selling price is double the profit triples find the profit percentage?
(a) 100%
(b) 200%
(c) 300%
(d) None of these
103. A trader bought 10 kg of apples for Rs. 405 out of which 1 kg of apples were found to be rotten. If he wishes to make a profit of 10 %, at what rate should he sell the remaining apples per kg?
(a) Rs. 45 (b) Rs. 49.50
(c) Rs. 50 (d) Rs. 51
104. A house worth Rs. 1,50,000 is sold by X at a 5 % profit to Y, Y sells the house back to X at a 2% loss. Then in the entire transaciton ?
(a) X gains Rs. 4,350
(b) X loses Rs. 4,350
(c) X gains Rs. 3,150
(d) X loses Rs. 3,150
105. A book-seller bought 200 textbooks for Rs. 12,000. He wanted to sell them at a profit so that he got 20 books free. At what profit percent should he sell them ?
(a) 10 (b) 11
(c) 11.5 (d) 12
106. An item costing Rs. 840 was sold by a shopkeeper to a buyer at a gain of 10 % and it was again sold by the buyer to the new buyer at a loss of 5%. Then final price of the item is :
(a) Rs. 877.80 (b) Rs. 798
(c) Rs. 924 (d) Rs. 37.80
107. 100 oranges are bought for Rs. 350 and sold at the rate of Rs. 48 per dozen. The percentage of profit or loss is :
(a) 15 % loss (b) 15 % gain
(c) $14\frac{2}{7}\%$ loss (d) $14\frac{2}{7}\%$ profit
108. Partha earns 15% on an investment but loses 10 percent on another investment. If the ratio of two investments is 3 : 5, then the combined loss percent is:
(a) $\frac{5}{4}\%$ (b) $\frac{4}{5}\%$
(c) $\frac{8}{5}\%$ (d) $\frac{5}{8}\%$
109. If the profit percent got on selling an article is numerically equal to its cost price in rupees and the selling price is Rs. 39, then cost price (in Rs.) will be :
(a) 20 (b) 22
(c) 28 (d) 30
110. The difference between the selling price and cost price of an article is Rs. 210. If the profit percent is 25%, then the selling price of the article is:



- (a) Rs. 950 (b) Rs. 1,050
(c) Rs. 1,150 (d) Rs. 1,250
111. If the total cost of 73 articles having equal cost is Rs. 5,110 and the total selling price of 89 such articles is Rs. 5,607, then in the transaction, there will be:
(a) a loss of 15 %
(b) a gain of 10 %
(c) a loss of 10%
(d) a gain of 15 %
112. If the cost price is 95 % of the selling price, what is the profit percent ?
(a) 4% (b) 4.75%
(c) 5% (d) 5.26%
113. A man purchases two fans for Rs. 2,160. By selling one fan at a profit of 15 % and the other at a loss of 9 % he neither gains nor loses in the whole transaction. Find the cost price of each fan in Rs. :
(a) 710, 1450 (b) 1530, 630
(c) 810, 1350 (d) 1340, 820
114. Oranges are bought at 7 for Rs. 3. At what rate per hundred must they be sold to gain 33 % ?
(a) Rs. 56 (b) Rs. 60
(c) Rs. 58 (d) Rs. 57
115. Profit after selling a commodity for Rs. 524 is the same as loss after selling it for Rs. 452. The cost price of the commodity is:
(a) Rs. 480 (b) Rs. 500
(c) Rs. 488 (d) Rs. 485
116. A man had 100 kgs of sugar, part of which he sold at 7 % profit and rest at 17 % profit. He gained 10 % on the whole. How much did he sell at 7 % profit?
(a) 65 kg (b) 35 kg
(c) 30 kg (d) 70 kg
117. A man bought two goats for Rs. 1008. He sold one at a loss of 20 % and other at a profit of 44 %. If each goat was sold for the same price the cost price of the goat which was sold at loss, was :
(a) Rs. 648 (b) Rs. 360
(c) Rs. 568 (d) Rs. 440
118. The percentage of loss when an article is sold at Rs. 50 is the same as that of the profit when it is sold at Rs. 70. The above mentioned of profit or loss on the article is :
(a) 10 % (b) $16\frac{2}{3}$ %
(c) 20 % (d) $22\frac{2}{3}$ %
119. The total cost price of two watches is Rs. 840. One is sold at a profit of 16 percent and the other at a loss of 12 percent. There is no loss or gain in the whole transaction. The cost price of the watch on which the shopkeeper gains, is :
(a) Rs. 360 (b) Rs. 370
(c) Rs. 380 (d) Rs. 390
120. A person sold a TV for Rs. 9,400 and he lost a particular amount. When he sold another TV of the same type at Rs. 10,600 his gain was double the former loss. What was the cost price of each TV ?
(a) Rs. 9,800
(b) Rs. 10,000
(c) Rs. 10,200
(d) Rs. 10,400
121. By selling 14 watches of equal cost price at the rate of Rs. 450 each, there is a profit equal to the cost price of 4 watches. The cost price of a watch is :
(a) Rs. 350 (b) Rs. 360
(c) Rs. 375 (d) Rs. 400
122. A shopkeeper bought 200 articles, each costing the same. He sold 30 % of the articles at 20 % profit and remaining at 10 % profit. If the total profit made by him is Rs. 2600, find the cost price of one article :
(a) Rs. 200 (b) Rs. 1300
(c) Rs. 2600 (d) Rs. 100
123. A milkman purchases the milk at Rs. x per litre and sells it at Rs. $2x$ per litre still he mixes 2 litres water with every 6 litres of pure milk. What is the profit percentage ?
(a) 116 % (b) 166.66 %
(c) 60 % (d) 100 %
124. A shopkeeper bought two cycles in Rs. 1600. If he sold first cycle at 10 % profit & the 2nd at 20% profit, he earns certain profit. If he sold first at 20 % profit and the second at 10 % profit, he got Rs. 5 more. The prices of both the cycles ?
(a) Rs. 825 and Rs. 775
(b) Rs. 600 & Rs. 1000
(c) Rs. 900 and Rs. 700
(d) Rs. 850 & Rs. 750
125. Rakesh Yadav sells a pen at 5 % loss and a book at 15 % profit, he gets Rs. 7 as a profit. if he sells the pen at 5 % profit and the book at 10 % profit, he gets Rs. 6 more. The prices of book & pen respectively are :
(a) Rs. 100, Rs. 80
(b) Rs. 70, Rs. 90
(c) Rs. 70, Rs. 110
(d) Rs. 80, Rs. 100
126. The cost price of 16 apples is equal to the selling price of 10 apples. The cost price of 12 oranges is equal to the selling price of 16 oranges and the cost price of 6 mangoes is equal to the selling price of 4 mangoes. if the ratio of the cost price of 1 apple, 1 orange & 1 mango is in the ratio of 1 : 1 : 2, then find the net profit percent on the sale of 1 apple, 2 oranges and 2 mangoes :
(a) 25 % (b) 30 %
(c) 35 % (d) 40 %
127. A tradesman fixed his selling price of goods at 30 % above the cost price. He sells half the stock at this price, one-quarter of his stock at a discount of 15 % on the original selling price and rest at a discount of 30 % on the original selling price. Find the gain percent altogether :
(a) 14.875 % (b) 15.375 %
(c) 15.575 % (d) 16.375 %



128. A merchant makes a profit of 20 % by selling an article. What would be the percentage change in the profit percent had he paid 10 % less for it and the customer paid 10 % more for it?
 (a) 120 % (b) 125 %
 (c) 133.33 % (d) 150 %
129. Cost price of two motorcycles is same. One is sold at a profit of 15 % and the other for Rs. 4800 more than the first. If the net profit is 20 %. Find the cost price of each motorcycle :
 (a) Rs. 48000 (b) Rs. 52000
 (c) Rs. 36000 (d) Rs. 42500
130. A horse and a carriage together cost Rs. 8,000. If by selling the horse at a profit of 10 % and the carriage at a loss of 10 % a total profit of 2.5 % is made, then what is the cost price of the horse?
 (a) Rs. 3,000 (b) Rs. 3,500
 (c) Rs. 4,000 (d) Rs. 5,000
131. Rakesh Yadav calculates his profit percentage on the selling price whereas Bhuvnesh calculates his profit on the cost price. They find that the difference of their profits is Rs. 275. If the selling price of both of them are the same, and Rakesh Yadav gets 25 % profit and Bhuvnesh gets 15 % profit, then find their selling price:
 (a) Rs. 2,100 (b) Rs. 2,300
 (c) Rs. 2,350 (d) Rs. 2,250
132. In a cricket match a contractor signs a contract of giving food for 24 players and decides to take a profit of $12\frac{1}{2}\%$ on the cost of food. 3 players found absent and remaining paid there bill. But a contractor suffers a loss of 30 rupees. Find the money which is paid by a player:
 (a) 75 (b) 80
 (c) 100 (d) 90
133. A man purchased 150 pens at the rate of Rs. 12 per pen. He sold 50 pens at a gain 10 %. The percentage gain at which he must sell the remaining pens so as to gain 15 % on the whole outlay is :
 (a) $21\frac{1}{2}\%$ (b) 20 %
 (c) 17 % (d) $17\frac{1}{2}\%$
134. A fruit seller buys 300 oranges at 5 for Rs. 8 and sold at 2 for Rs. 5. Find :
 (i) profit percentage on selling one orange
 (ii) his total profit on selling all the orange.
 (a) 56.25%, Rs. 270
 (b) 50%, Rs. 270
 (c) 12%, Rs. 280
 (d) 9%, Rs. 230
135. A shopkeeper buys 100 eggs at Rs. 1.20 per piece. Unfortunately 4 eggs got spoiled during transportation. The shopkeeper sells the remaining eggs at Rs. 15 a dozen. Find his profit or loss.
 (a) 4% loss
 (b) No profit No loss
 (c) 4% profit
 (d) None of these
136. A dealer sold 600 quintals of sugar at a profit of 7%. If a quintal of sugar cost him Rs. 1600, find his total profit and the selling price.
 (a) 67200, 12072
 (b) 67000, 102720
 (c) 67200, 1027200
 (d) None of these
137. A dealer buys 200 quintals of wheat at Rs. 1200 a quintal. He spends Rs. 10,000 on transportation and storage. Then he sells the wheat at Rs. 13 per kg. Find his profit or loss percentage.
 (a) 4% loss (b) 5% loss
 (c) 5% profit (d) 4% profit
138. By selling a colour TV for Rs. 23520, a dealer suffers a loss of 4%. At what price should he sell it to gain 8% ?
 (a) Rs. 26460 (b) Rs. 26450
 (c) Rs. 25460 (d) None of these
139. Rakesh Yadav bought 1200 eggs at Rs. 16 a dozen. At what price per dozen must he sell the eggs so as to earn a profit of 15% ?
 (a) Rs. 18.20 (b) Rs. 18.40
 (c) Rs. 16.15 (d) None of these
140. Rakesh Yadav purchased two cars for Rs. 18,000 and Rs. 15,000 respectively. He sold them at a loss of 15% and a gain of 19% respectively. Find the overall gain or loss percent in the transaction.
 (a) $\frac{5}{11}\%$ profit (b) $\frac{5}{9}\%$
 (c) $\frac{3}{11}\%$ profit (d) None of these
141. If the marked price of an article is Rs. 450 and marked percentage is 12.5%, what is the cost price ?
 (a) 400 (b) 408
 (c) 300 (d) 430
142. If the markup percentage of an article is 50% and discount percentage is also 20%, then the profit percentage will be :
 (a) 10% (b) 0%
 (c) 30% (d) 20%
143. A man sells two wrist watches one at a profit of 10% and another at a loss of 10%, but the selling price of each watch is Rs. 200. Find the net amount of profit or loss.
 (a) 2.02 (b) 4.04
 (c) 3.04 (d) None of these
144. There were two articles and the sum of cost price of these articles is Rs. 500. One of them was sold at a profit of 20% and another at a loss of 20%. Besides if the selling prices of both the articles were same. Find the amount of overall loss.
 (a) Rs. 20 (b) Rs. 30
 (c) Rs. 40 (d) None of these
145. If the cost price of 15 articles is same as the selling price of 20 articles. What is the gain or loss percent ?
 (a) 25% loss (b) 25% profit
 (c) 20% loss (d) None of these



146. If the selling price of 10 Computers is the same as the cost price of 12 computers. What is the profit or loss percent ?
 (a) 20% profit (b) 20% loss
 (c) 10% profit (d) 10% loss
147. By selling 18 chocolates, a vendor loses the selling price of 2 chocolates. Find his loss per cent.
 (a) 15% (b) 10%
 (c) 20% (d) 8%
148. A trader sells all his articles at the cost price but gives 10% less amount as he should give. What is the percentage profit?
 (a) $11\frac{1}{9}\%$ (b) $11\frac{2}{3}\%$
 (c) $8\frac{1}{3}\%$ (d) None of these
149. A trader by means of his false balance defrauds to the extent of 10% in buying goods and also defrauds to 10% in selling. Find his gain per cent.
 (a) 21% (b) $22\frac{2}{9}\%$
 (c) $21\frac{1}{9}\%$ (d) None of these
150. The CP of an article is $\frac{5}{6}$ th of the SP. What is the percentage profit or loss ?
 (a) 20% loss (b) 16.66% profit
 (c) 16.66% loss (d) 20% profit
151. The MP of an article is $\frac{3}{2}$ of the CP and SP is $\frac{9}{10}$ of MP. Find the percentage profit or loss.
 (a) 25% profit (b) 35% profit
 (c) 33.33% loss (d) None of these
152. The MP of an article is 30% higher than its CP and 20% discount is allowed on this article then the profit percentage?
 (a) 10% (b) 14%
 (c) 4% (d) 26%
153. On selling an article for Rs. 576 a trader loses 4%. In order to gain $4\frac{1}{6}\%$, he must sell that article for:
 (a) Rs. 636
 (b) Rs. 676
 (c) Rs. 625
 (d) Can't be determined
154. The percent profit made when an article is sold for Rs. 56 is thrice as when it is sold for Rs. 42. The cost price of the article is :
 (a) Rs. 48 (b) Rs. 49
 (c) Rs. 50 (d) Rs. 35
155. A shopkeeper uses a weight of 460 g instead of 500 g and sells the articles at the cost price. What is the profit percentage?
 (a) 40% (b) 23%
 (c) $8\frac{16}{23}\%$ (d) 20%
156. A trader uses a weight of 920 g instead of 1 kg and sells the articles at the marked price which is 15% above the cost price. Find the profit percentage.
 (a) 20% (b) 23%
 (c) 25% (d) None of these
157. If a gift pack is sold at a gain of 6% instead of at a loss of 6%, then the seller gets Rs. 6 more. The cost price of the gift pack.
 (a) Rs. 60 (b) Rs. 66
 (c) Rs. 50 (d) Rs. 36
158. A man sells a bicycle at a gain of 10%. If he had bought it at 10% less and sold it for Rs. 132 less, he would have still gained 10%. The cost price of the bicycle.
 (a) Rs. 1000 (b) Rs. 1200
 (c) Rs. 1500 (d) Rs. 1320
159. An article costing Rs. 600 is being sold at 20% loss. If the price is further reduced by 12.5%, the selling price will be :
 (a) Rs. 400 (b) Rs. 380
 (c) Rs. 420 (d) Rs. 525
160. While selling an electric Bulb a dealer gives a discount of 5%. If he gives a discount of 8%, he earns Rs. 36 less as profit. The marked price of the bulb is :
 (a) Rs. 1000 (b) Rs. 1200
 (c) Rs. 800 (d) None of these
161. If a commission of 10% is given on the marked price of a book, the publisher gains 20%. If the commission is increased to 15%, the gain of publisher is :
 (a) $13\frac{1}{3}\%$ (b) 15%
 (c) 18%
 (d) Data insufficient
162. A retailer buys a cellphone at a discount of 15% and sells it for Rs. 5865. Thus, he makes a profit of 15%. The discount is :
 (a) Rs. 200 (b) Rs. 850
 (c) Rs. 750 (d) Rs. 1035
163. At what percent above the cost price must an articles be marked so as to gain 17% after allowing a discount of 10% ?
 (a) 34% (b) 70%
 (c) 30% (d) 27%
164. A trader marks his goods at Rs 900 and gives discount of 25%. if he earns 12.5% profit, find the cost price of his goods.
 (a) Rs. 500 (b) Rs. 600
 (c) Rs. 720 (d) None of these
165. A vendor buys apples Rs. 2 for 3 apples and sells them at a rupee each. To make a profit of Rs. 10, he must sell:
 (a) 10 apples (b) 20 apples
 (c) 30 apples (d) 40 apples
166. Rakesh Yadav and Bhuvnesh both are dealers of Akash Helicopters. The price of a Akash Helicoptes is Rs. 28,000. Rakesh Yadav gives a discount of 10% on the whole, while Bhuvnesh gives a discount of 12% on the first Rs. 20,000 and 8% on the rest Rs. 8000. What is the difference between their selling prices ?
 (a) Rs. 240 (b) Rs. 420
 (c) Rs. 640 (d) None of these
167. A trader sells two articles, one at a loss of 10% and another at a profit of 15% but finally there is no loss or gain. If the total sale price of these two articles is Rs. 30,000, find the difference between their cost prices :
 (a) Rs. 5000 (b) Rs. 6000
 (c) Rs. 7500 (d) None of these



168. A milkman purchases the milk at Rs. x per litre and sells it at Rs. $2x$ per litre still he mixes 2 litres water with every 6 litres of pure milk. What is the profit percentage :

- (a) 116% (b) $166\frac{2}{3}\%$
(c) 60% (d) $133\frac{2}{3}\%$

169. 60% goods are sold at 5% loss while rest are sold at 10% profit. If there is a total profit of Rs. 100, then the worth of goods sold is :
(a) Rs. 6000 (b) Rs. 5000
(c) Rs. 10000 (d) None of these

170. A retailer bought 20 kg tea at a discount of 10%. Besides 1 kg tea was freely offered to him by the wholesaler at the purchase of 20 kg tea. Now he sells all the tea at the marked price to a customer. What is profit percentage of retailer ?

- (a) 30% (b) $12\frac{1}{2}\%$
(c) $16\frac{2}{3}\%$ (d) None of these

171. Two articles are sold at the same price. One at a profit of 75% and another one at a loss of 30%. What is the overall profit or loss ?

- (a) 22.5% profit (b) 57.5% profit
(c) $13\frac{2}{7}\%$ loss (d) None of these

172. What is percentage profit in selling an article at a discount of 20% which was earlier being sold at a 40% profit ?

- (a) 20% (b) 14%
(c) 28% (d) 12%

173. A man bought 18 apples for a rupee and sold them at 12 apples for a rupee. What is the profit percentage ?

- (a) 33.33% (b) 50%
(c) 66.66% (d) None of these

174. A dealer buys a product at Rs. 1920. He sells at a discount of 20% still he gets the profit of 20%. What is the selling price of that product ?

- (a) Rs. 2304
(b) Rs. 1536
(c) Rs. 2200
(d) It is not possible

175. Rakesh Yadav purchased the articles for Rs. 123684. He sold 60% of those at a profit of 16.66% and rest at a loss. Find the loss percentage on the remaining if the overall loss is 14% ?

- (a) 20% (b) 30%
(c) 60% (d) 66.66%

176. What should be the minimum markup percentage such that

after giving a discount of $66\frac{2}{3}\%$, there will not be a loss ?

- (a) 200% (b) 133.33%
(c) 100% (d) 150%

177. The ratio of cost price and marked price of an article is 2 : 3 and ratio of percentage profit and percentage discount is 3 : 2. What is the discount percentage ?

- (a) 16.66% (b) 20%
(c) 25% (d) 33.33%

178. A dealer gives as much discount (in percent) as the markup (in percent) above the cost price. What is the profit or loss percent ?

- (a) 10%
(b) 1%
(c) 4%
(d) Can't be determined

179. A shopkeeper sold 12 cameras at a profit of 20% and 8 cameras at profit of 10%. If he has sold all 20 cameras at 15% profit then his profit would have been reduced by Rs. 36. What is the cost price of each camera ?

- (a) 100 (b) 150
(c) 180 (d) 220

180. Mr. Rakesh Yadav purchased a car for Rs. 3,00,000 and a bike for his son for Rs. 1,00,000. He sold the car at a profit of 10% and bike at a loss of 20%. What is the net gain or loss ?

- (a) 2% gain
(b) 1.5% loss
(c) 10% loss
(d) 10% gain

181. A trader sells 20 kg of sugar at Rs. 400. A customer asks 20% discount and he agrees to it but instead of 1kg he gives 4% less sugar. What is the effective discount that the customer gets ?

- (a) 16% (b) $16\frac{2}{3}\%$
(c) 15.5% (d) $8\frac{1}{3}\%$

182. The profit percentage on the three articles A, B and C is 10%, 20% and 25% and the ratio of the cost price is 1 : 2 : 4. Also the ratio of number of articles sold of A, B and C is 2 : 5 : 2, then the overall profit percentage is :

- (a) 18.5%
(b) 21%
(c) 75%
(d) None of these

183. The marked price of an article is increased by 25% and the selling price is increased by 16.66%, then the amount of profit doubles. If the original marked price be Rs. 400 which is greater than the corresponding cost price by 33.33%, what is the increased selling price ?

- (a) 240 (b) 360
(c) 420 (d) 600

184. A shopkeeper calculated his profit percent on the selling price which comes out to be 30%. If it had been calculated as usual on the cost price then what is the required percentage profit ?

- (a) $42\frac{6}{7}\%$ (b) $4\frac{7}{27}\%$
(c) $7\frac{6}{42}$ (d) None of these



185. The cost price of an article 'A' is Rs. 160 and selling price of another article 'B' is Rs. 240. If the selling price of A will be equal to the cost price of B, then the profit after selling A is 20%. What is the profit on 'B' ?
 (a) 16.66% (b) 50%
 (c) 25% (d) None of these
186. A person sold two cows each for Rs. 9900. If he gained 10% on one and lost 20% on the other, then which of the following is true. ?
 (a) He gained Rs. 200
 (b) He lost Rs. 200
 (c) Loss of Rs. 1575
 (d) None of these
187. Two third of a consignment was sold at a profit of 5% and the remainder at a loss of 2%. If the total profit was Rs. 400, the value of the consignment (in rupees) was :
 (a) 15000 (b) 20000
 (c) 10000 (d) 12000
188. A fruit seller declares that he sells fruits at the cost price. However, he uses a weight of 450 g instead of 500 g. His percentage profit is :
 (a) 10% (b) $11\frac{1}{9}\%$
 (c) 12% (d) $12\frac{2}{9}\%$
189. A person loses Rs. 20 by selling some bananas at the rate of Rs. 3 per banana and gains Rs. 30, if he sells them at Rs. 3.25 per banana. The number of bananas sold by him :
 (a) 100 (b) 200
 (c) 120 (d) 2400
190. Due to an increase of 30% in the price of eggs, 3 eggs less are available for Rs. 9.10. The present rate per egg is :
 (a) 91 paise (b) 78 paise
 (c) 48 paise (d) 84 paise
191. A dealer buys a washing machine, listed at Rs. 10000 and gets 10% and 20% successive discounts. He spends 10% of his CP on transport. At what price (in rupees) should he sell the washing machine to earn a profit of 10% ?
 (a) 8722 (b) 7892
 (c) 8712 (d) 8840
192. By selling a wrist watch at Rs. 405 the shopkeeper incurs a loss of 10%. What is the gain or loss percentage if he sells the same watch at Rs. 465 ?
 (a) Profit of 10%
 (b) loss of 6%
 (c) Profit of 3.33%
 (d) No profit No loss
193. Titan sells a wrist watch to a wholeseller making a profit of 10%. The wholeseller, in turn, sells it to the retailer making a profit of 10%. A customer purchases it by paying Rs. 990. Thus the profit of retailer is $2\frac{3}{11}\%$. What is the cost incurred by the Titan to produce it ?
 (a) 768 (b) 750
 (c) 800 (d) 820
194. When a shopkeeper reduces the selling price from 1080 to 1026 its loss increases by 4 percentage point. What is the selling price of this same article when it fetches a profit of 4% ?
 (a) Rs. 1392 (b) Rs. 1404
 (c) Rs. 1450 (d) Rs. 1350
195. A company instead of raising the mark-up by 20% discounted the cost price by 20% while stitching the price tag on its product. Further the company offers a discount of 6.25% to its customer. In this process company incurs a loss of Rs. 37.5 on a single article. What is the selling price of that article ?
 (a) 417.5 (b) 112.5
 (c) 365.5 (d) None of these
196. When an article is sold for Rs. 703 loss incurred is 25% less than the profit earned on selling it at Rs. 836. What is the selling price of the article when it earns a profit of 20% ?
 (a) 912 (b) 1576
 (c) 1532 (d) 1092
197. A scientific calculator is available at Universal Shop in Hazrat ganz at 20% discount and the same is available at only 15% discount at Universal Shop Bhootnath Market. Ms. Agrawal has just sufficient amount of Rs. 800 to purchase it at Universal Shop Hazrat ganz. What is the amount that Ms. Agrawal has less than the required amount to purchase it at Universal Shop Bhootnath ?
 (a) Rs. 70
 (b) Rs. 50
 (c) Rs. 100
 (d) Data insufficient
198. A balance of a trader weighs 10% less than it should be. Still the trader marks-up his goods to get the overall profit of 20%. What is the markup on the cost price ?
 (a) 40% (b) 8%
 (c) 25% (d) 16.66%
199. A bookseller procures 40 books for Rs. 3200 and sells them at a profit equal to the selling price of 8 books. What is the selling price of one dozen books, if the price of each book is same ?
 (a) 720 (b) 960
 (c) 1200 (d) 1440
200. The profit percentage of A and B is same on selling the articles at Rs. 1800 each but A calculates his profit on the selling price while B calculates it correctly on the cost price which is equal to 20%. What is the difference in their profits ?
 (a) Rs. 360 (b) Rs. 60
 (c) Rs. 540 (d) Rs. 450
201. Each of A and B sold their article at Rs. 1818 but A incurred a loss of 10% while B gained by 1%. What is the ratio of cost price of the articles of A to that of B ?
 (a) 101 : 90 (b) 85 : 89
 (c) 81 : 75 (d) None of these



202. A trader sold an article at a loss of 5% but when he increased the selling price by Rs. 65 he gained 3.33% on the cost price. If he sells the same article at Rs. 936, what is the profit percentage ?
 (a) 15%
 (b) 16.66%
 (c) 20%
 (d) Data insufficient
203. Even after a discount of $q\%$ on marked price a trader gains by $p\%$. What is the markup percentage over the cost price ?
 (a) $\frac{p+q}{(q-p)} \times 100$
 (b) $\frac{p+q}{(100-p)} \times 100$
 (c) $\frac{p+q}{(100-q)} \times 100$
 (d) Not possible
204. A milkman mixes 10% water in pure milk but he is not content with it so he again mixes 10% more water in the previous mixture. What is the profit percentage of milkman if he sells it at cost price :
 (a) 11.11% (b) 20%
 (c) 21% (d) 12.1%
205. A person sold an electronic watch at Rs. 96 in such a way that his percentage profit is same as the cost price of the watch. If he sells it at twice the percentage profit of its previous percentage profit then the new selling price will be :
 (a) Rs. 132 (b) Rs. 150
 (c) Rs. 192 (d) Rs. 180
206. A trader mixes 25% kerosene to his petrol and then he sells the whole mixture at the price of petrol. If the cost price of kerosene be 50% of the cost price of petrol, what is the net profit percentage ?
 (a) $11\frac{1}{9}\%$ (b) $12\frac{1}{9}\%$
 (c) $9\frac{1}{11}\%$ (d) 20%
207. A retailer cheats both to his whole-seller and his customer by 10% by his faulty balance i.e, he actually weighs 10% more while purchasing from wholeseller and weighs 10% less while selling to his customer. What is the net profit percentage, when he sells at CP ?
 (a) $22\frac{2}{11}\%$ (b) $22\frac{2}{9}\%$
 (c) 20% (d) 21%
208. A trader procures his goods from a wholeseller, whose balance reads 1200 g for 1000 g. The trader sells at the procured goods to a customer after marking up the goods at 20% above the cost price. What is the overall percentage profit or loss in the whole transaction ?
 (a) 38% profit
 (b) 50% profit
 (c) No profit No loss
 (d) None of these
209. A person wants to reduce the trade tax so he calculates his profit on the sale price instead of on the cost price. In this way by selling a article for Rs. 280 he calculates his profit as $14\frac{2}{7}\%$. What is his actual profit percentage ?
 (a) 20%
 (b) 16.66%
 (c) 25%
 (d) Data insufficient
210. A vendor sells his articles at a certain percentage. If he sells his articles at $\frac{1}{3}$ of his actual selling price, then he incurs a loss of 40%. What is his actual profit percentage ?
 (a) 72% (b) 120%
 (c) 80% (d) None of these
211. A retailer increases the selling price by 25% due to which his profit percentage increases from 20% to 25%. What is the percentage increase in cost price?
 (a) 20% (b) 30%
 (c) 25% (d) 50%
212. Abhinav saves Rs. 25 by getting 6.66% discount on a textbook. What is the amount of money (in Rs.) paid by him ?
 (a) 450 (b) 350
 (c) 225 (d) 375
213. At kul-kul petrol pump the operator gives 5% less petrol but he sells it at the cost price. What is his profit in this way ?
 (a) 5% (b) 5.6%
 (c) 5.26% (d) 4.78%
214. Due to reduction of 25% in price of oranges a customer can purchase 4 oranges more for Rs. 16. What is original price of an orange ?
 (a) Rs. 1 (b) Rs. 1.33
 (c) Rs. 1.5 (d) Rs. 1.6
215. A reduction of 20% in the price of sugar enables a housewife to purchase 6 kg more for Rs. 240. What is the original price per kg of sugar ?
 (a) Rs. 10 per kg
 (b) Rs. 8 per kg
 (c) Rs. 6 per kg
 (d) Rs. 5 per kg
216. A wholeseller sells toys at a profit of 20% to a retailer and retailer sells these toys to its customer at a profit of 25%. What is the profit percentage of the retailer ?
 (a) 5% (b) 80%
 (c) 20% (d) 25%
217. An automobile agency launched a scheme that if a customer purchases two Bajaj Discover bikes, one extra Bajaj Discover will be free and if he purchases 3 Bajaj Pulsar he will get one extra Bajaj Pulsar free. If the cost price of 3 Bajaj Discover and 4 Bajaj Pulsar be Rs. 67500 and Rs. 232500 respectively. If a customer purchases 2 bikes of Bajaj Discover and 3 bikes of Bajaj Pulsar as per scheme he availed 1 bike free of each category, then at what price these bikes should be sold so that the agency can get overall profit of 17.5% :
 (a) 235250 (b) 352500
 (c) 368000 (d) 268000



218. Rahul went to purchase a Nokia mobile handset, the shopkeeper told him to pay 20% tax if he asked the bill. Rahul manages to get the discount of 5% on the actual sale price of the mobile and he paid the shopkeeper Rs. 3325 without tax. Besides he manages to avoid to pay 20% tax on the already discounted price, what is the amount of discount that he has gotten ?
- (a) 750 (b) 375
(c) 875 (d) 525
219. When a bicycle manufacturer reduced its selling price by 50%, the number of bicycles sold radically increased by 600%. Initially the manufacturer was getting only 140% profit. What is the percentage increase of his profit ?
- (a) 10%
(b) 14%
(c) 0%
(d) can't be determined
220. A trader marks his goods such that he can make 32% profit after giving 12% discount. However a customer availed 20% discount instead of 12%. What is the new profit percentage of trader ?
- (a) 20% (b) 44%
(c) 30% (d) 28.8%
221. A retailer bought 3850 Linc pens and 1848 Cello pens at the same price. He sells Linc pens in such a way that he can buy 650 Linc pens with the sale price of 481 Linc pens. Again he can buy only 408 Cello pens with the sale price of 629 pens. What is the overall percentage of profit of the retailer ?
- (a) 4.8%
(b) 9.6%
(c) 13%
(d) None of these
222. Anna sold his car to Boney at a profit of 20% and Boney sold it to Chokori at a profit of 10%. Chokori sold it to mechanic at a loss of 9.09%. Mechanic spent 10% of his purchasing price and then sold it at a profit of 8.33% to Anna once again. What is the loss of Anna ?
- (a) 23% (b) 29%
(c) 50% (d) 40%
223. In an office the number of employees reduces in the ratio of 3 : 2 and the wages increases in the ratio of 20 : 27. What is the percentage change in the wages of the employees ?
- (a) 10%
(b) 9.09%
(c) 11.11%
(d) None of these
224. I asked the shopkeeper the price of a wristwatch. I found that I had just the required sum of money. When the shopkeeper allowed me a discount of 25%, I could bought another watch worth Rs. 940 for my younger sister. What is the price which I have paid for my own watch ?
- (a) Rs. 2700 (b) Rs. 1800
(c) Rs. 2820 (d) Rs. 3760
225. A and B are two partners and they have invested Rs. 54,000 and Rs. 90,000 in a business. After one year A received Rs. 1800 as his share of profit out of total profit of Rs. 3600 including his certain commission on total profit since he is a working partner and rest profit is received by B. What is the commission of A as a percentage of the total profit ?
- (a) 20% (b) 10%
(c) 5% (d) 25%
226. A trader sells goods to customer at a profit of $k\%$ over the cost price, besides it he cheats his customer by giving 880 g only instead of 1 kg. Thus his overall profit percentage is 25%. Find the value of k ?
- (a) 8.33% (b) 8.25%
(c) 10% (d) 12.5%
227. A trader sells two brands of petrol; one is Extra Premium (EP) and other one is Speed (SP). He mixes 12 litres of EP with 3 litres of speed and by selling this mixture at the price of EP he gets the profit of 9.09%. If the price of Extra Premium be Rs. 48 per litre, then the price of Speed (SP) is :
- (a) Rs. 38 per litre
(b) Rs. 42 per litre
(c) Rs. 28 per litre
(d) None of these
228. A, B and C invest in the ratio of 3 : 4 : 5. The percentage of return on their investments are in the ratio of 6 : 5 : 4. Find the total earnings, if B earns Rs. 250 more than A :
- (a) Rs. 6000
(b) Rs. 7250
(c) Rs. 5000
(d) None of these
229. Ajay bought a motor cycle for Rs. 50,000. 2 years later he sold it to Bijoy at 10% less of the cost price. Bijoy spend 5% of the purchasing price on its maintenance. Later Bijoy displayed the sale price of his motorcycle Rs. 50,000. Chetan wanted to purchase it at 15% discount but Bijoy gave him two successive discounts of 10% and 5% instead of 15% in one time. What is the actual discount availed by Chetan ?
- (a) 15% (b) 15.5%
(c) 14.5% (d) None of these
230. Kamal bought a house in Sushant city, whose sale price was Rs. 8 Lakh. He availed 20% discount as an early bird offer and then 10% discount due to cash payment. After that he spent 10% of the cost price in interior decoration and lawn of the house. At what price should he sell the house to earn a profit of 25% ?
- (a) Rs. 9 lakh
(b) Rs. 7.99 lakh
(c) Rs. 7.92 lakh
(d) None of these



231. I wanted to purchase 10 chairs for the class room whose cost was Rs. 200 each. The trader offered me a discount if I were to purchase a set of 12 chairs. So I calculated that if I assume the normal price of 10 chairs then we can purchase 2 extra chairs which cost me only Rs. 80 each to two chairs at the cost price of 12 chairs after discount. What is the percentage discount ?

- (a) 6% (b) 8%
(c) 12% (d) 10%

232. The cost of servicing of a Maruti car at Maruti care Pvt. Ltd. is Rs. 400. Manager of service centre told me that for the second service within a year a customer can avail a 10% discount and further for third and fourth servicing he can avail 10% discount of the previous amount paid, within a year. Further if a customer gets more than 4 services within a year he has to pay just 60% of the servicing charges on these services. A customer availed 5 services from the same servicing station, what is the total percentage discount fetched by the customer ?

- (a) 19.22% (b) 18.5%
(c) 17.6% (d) 26%

233. The cost price of an article is C and the selling price of the same article is S, where Z is the profit or loss percentage. If the cost price and selling price both are increased by same amount then which of the following is true :

- (a) Z increases
(b) Z decreases
(c) remains constant
(d) None of these

234. Cost price of 12 oranges is equal to the selling price of 9 oranges and the discount on 10 oranges is equal to the profit on 5 oranges.

What is the percentage point difference between the profit percentage and discount percentage ?

- (a) 20 (b) 22.22
(c) 16.66 (d) 15

235. A car mechanic purchased four old cars for Rs. 1 lakh. he spent total 2 lakh in the maintenance and repairing of these four cars. What is the average sale price of the rest three cars to get 50% total profit if he has already sold one of the four cars at Rs. 1.2 lakh ?

- (a) 1.5 lakh (b) 1.1 lakh
(c) 1.2 lakh (d) 1.65 lakh

236. The cost of setting up a magazine is Rs. 2800. The cost of paper and ink etc is Rs. 80 per 100 copies and printing cost is Rs. 160 per 100 copies. In the last month 2000 copies were printed but only 1500 copies could be sold at Rs. 5 each. Total 25% profit on the sale price was realized. There is one more resource of income from the magazine which is advertising. What sum of money was obtained from the advertising in magazine ?

- (a) Rs. 1750 (b) Rs. 2350
(c) Rs. 1150 (d) Rs. 1975

237. DSNL charges fixed rental of Rs. 350 per month. It allows 200 calls free per month. Each call is charged at Rs. 1.4 when the number of calls exceeds 200 per month and it charges Rs. 1.6 when the number of calls exceeds 400 per month and so on. A customer made 150 calls in February and 250 calls in March. By how much per cent the each call is cheaper in March than each call in February ?

- (a) 28% (b) 25%
(c) 18.5% (d) None of these

238. A person bought some pen at the rate of 4 for Rs. 15 and he sold all the pen at the rate of 6 for Rs. 25 in this way he got a profit of Rs. 25 Find how many pen did he buy and also find his profit percentage ?

- (a) $48, 11\frac{1}{9}\%$ (b) $36, 9\frac{1}{11}\%$
(c) 50, 10% (d) $60, 11\frac{1}{9}\%$

239. A fruit seller sold 200 mangoes on some day and he made a profit equal to the selling price of 40 mangoes while on the next day, he sold 200 mangoes and suffered a loss equal to the selling price of 40 mangoes. Find the mathematical value of the difference between % profit and loss made in two situation.

- (a) $8\frac{1}{3}$ (b) 0
(c) 5 (d) $3\frac{1}{3}$

240. A shopkeeper made a profit of 20% on all the commodities and he also gives 100 gm less for every 1 kg. Find his actual profit percentage -

- (a) 30% (b) $26\frac{2}{3}\%$
(c) $33\frac{1}{3}\%$ (d) 25%

241. A shopkeeper bought two watches for Rs. 1950 and sold one at 20% profit while other at 25% loss. if the selling price of both watches is equal then find the cost price of each watch.

- (a) 750, 1200 (b) 950, 1000
(c) 725, 1225 (d) 450, 1500

242. A man sold two scooters for equal selling price of Rs. 40,000 each. At one he made a profit of 20% while at other he suffered 20% loss. Find his loss percentage and also find how many rupees his loss was ?

- (a) 0%, 0 (b) 4%, $\frac{10000}{3}$
(c) 5%, 4000 (d) 4%, $\frac{1000}{3}$

243. A company sold the radio produced by it to the whole seller at 20% profit. Whole seller sold it to the retailer at 10% profit and the retailer sold it to a customer at 25% loss. If the customer has paid 2475 rupees for it, then find the production cost of the radio.



- (a) 2,000 (b) 3,000
(c) 2450 (d) 2500
244. A person sold three cows for Rs. 8,000, Rs. 12,000 and 6,000 respectively. On first cow he made a profit of 25% and on second he made 20% profit. If he made 30% profit on over all transaction, find the cost of third cow ?
(a) 3800 (b) 3850
(c) 3700 (d) 3600
245. A person sold his t.v. set for Rs. 7500 suffering a $6\frac{1}{4}\%$ loss If he wants to earn $12\frac{1}{2}\%$ profit, at what rate must he sell the t.v. set ?
(a) 9000 (b) 10,000
(c) 8000 (d) 8800
246. A buffalo was sold at 8% profit. If it was bought at 20% less and sold at 40% profit, the owner would have got Rs. 640 more. Find the initial cost price of the buffalo.
(a) 15,000 (b) 16,000
(c) 20,000 (d) 25,000
247. When a commodity is sold at Rs. 1200 then there is a profit of $\frac{1}{5}$ part of selling price. At what cost the commodity must be sold to get a profit of $\frac{1}{3}$ part of cost price.
(a) 1200 (b) 1000
(c) 1280 (d) None of these.
248. When a cow is sold for Rs. 15,000 there is a loss to the seller. When the cow is sold for Rs. 18,000 there is a profit to the seller. If the profit is 20% of the loss, find the cost of Cow.
(a) 17,000
(b) 20,000
(c) 17,500
(d) can't be determined.
249. A shopkeeper bought some pencil at 6 for Rs. 20 and other double in number at 8 for Rs. 26 If mixing them altogether he sold them at 24 for Rs. 118 find his profit percentage.
(a) 75% (b) 25%
(c) 40% (d) 50%
250. A shopkeeper bought 180 quintal wheat at the rate Rs. 600 per quintal. He sold 80 quintal wheat at 10% profit and 70 quintal at 20% At what rate must he sells the remaining wheat so that he may get 15% profit on over all transaction.
(a) Rs. 800 per quintal
(b) Rs. 10,00 per quintal
(c) Rs. 650 per quintal
(d) Rs. 700 per quintal
251. A shopkeeper gives 10% discount at the marked price. What should be the marked price of a commodity costing 1080 if the shopkeeper wants to make a profit of 25% ?
(a) Rs. 1250 (b) Rs. 1500
(c) Rs. 1200 (d) Rs. 1600
252. A book seller marked the price at 50% higher than price of a book. He gives a discount of 15% on the marked price. In this way he got a profit of Rs. 165, find the marked price of the book.
(a) Rs. 100 (b) Rs. 800
(c) Rs. 750 (d) Rs. 900
253. A shopkeeper bought first type pulse at Rs. 20 per kg. and another type of pulse at Rs. 25 per kg. He then mixes both types of pulses and sold the mixture at Rs. 25 per kg. making a profit of 10% If he had bought 60 kg. first type pulse. Find the quantity in kg of second type pulse .
(a) 72 kg. (b) 80 kg.
(c) 75 kg. (d) 78 kg.
254. cost price of 1 kg. tea and 4 kg. coffee is Rs. 300. if the tea was sold at 20% profit and coffee at 10% profit than there is a net profit of Rs. 34. find the cost of tea and coffee per kg.
(a) Rs. 50, Rs. 80
(b) Rs. 40, Rs. 55
(c) Rs. 40, Rs. 60
(d) Rs. 40, Rs. 65
255. A shopkeeper sold a pen for Rs. 39, he got the same profit percentage as its price was. Find the cost of the pen.
(a) Rs. 20 (b) Rs. 28
(c) Rs. 35 (d) Rs. 30
256. A fruit seller bought 300 apples at the rate of Rs. 15 per dozen. In all 50 apples got rotten. then at what rate per dozen he must sell the remaining apples to get a profit of 40% ?
(a) Rs. 25.20 (b) Rs. 24.80
(c) Rs. 25.00 (d) Rs. 25.8
257. A radio seller give a discount of 25% on list price and makes a profit of 30%. If he makes profit of 90 rupees then find the amount he gave as discount -
(a) Rs. 100 (d) Rs. 150
(c) Rs. 110 (d) Rs. 130
258. A trader bought 7 typing machine for Rs. 3500 per machine and he spent 10% of the total cost of machine to purchase boxes in which the machine were packed. What should be the marked price of of all the machines combinedly, so, that after giving 25% discount he could earn Rs. 3050 ?
(a) 50,000 (b) 40,000
(c) 48,000 (d) 45,000
259. A man bought 5 cows and 13 buffalo. for Rs. 51,000 He sold cows at 15% profit and buffalos at 10% loss. In this way he got a profit of Rs. 1150. Find the cost price of 2 cows and 3 buffaloss.
(a) 18,000 (b) 17,500
(c) 15,000 (d) 16,000
260. Two different type of watches were bought for 3360 rupees. One was sold at 12% loss and other at 12% profit and there was no loss and no profit during whole transaction. Find the cost price of each watch.
(a) Rs. 1600, Rs. 1760
(b) Rs. 1800, Rs. 1560
(c) Rs. 1680, Rs. 1680
(d) None of these.



261. A company gives a discount of 15% on list price to its customers making a profit of 19%. When production cost increases by 12%, company issues new list price which was 10% above the earlier. If the company continues to give the discount of 15% find the profit at new production cost.
(a) 16.275% (b) 16.50%
(c) 16.625 (d) 16.875%
262. A man bought some articles. He sold $\frac{1}{3}$ of the articles at 14% profit, $\frac{3}{5}$ of the articles at $17\frac{1}{2}\%$ profit and the remaining articles at 20% profit. Find the profit during whole transaction.
(a) 16% (b) 20%
(c) $17\frac{1}{2}\%$ (d) $16\frac{1}{2}\%$
263. A sold his goods 10% cheaper than B but 10% costlier than C. If the customer of B purchase a goods from C in 10 rupees. than how many rupees has he saved ?
(a) Rs. $\frac{20}{11}$ (b) $\frac{20}{9}$
(c) Rs. 2 (d) Rs. 3
264. If I sell a horse for Rs. 6200 and a cow for Rs. 2600 than I got 10% profit on the cost of both. if I sell the horse for Rs. 6000 and the cow at its cost price than I get a profit of $12\frac{1}{2}\%$ find the cost price of both the horse and the cow.
(a) Rs. 4500, Rs. 3500
(b) Rs. 4000, Rs. 4000
(c) Rs. 5000, Rs. 3000
(d) Rs. 5500, Rs. 2500
265. A person bought a pen and a book. the sold book at 10% loss and pen at 20% profit making no profit no loss during the whole transaction. If he sells the book at 5% profit and pen at 20% profit then he will get a profit of Rs. 60. Find the cost of both the book and the pen .
(a) 200, 400 (b) 300, 250
(c) 250, 300 (d) 400, 200
266. A trader sold 90 quintals wheat at 8% profit and 50 quintal wheat at 10% profit. Had he sold all the wheat at 9% profit he would have earned Rs. 120 more. Find per quintal price of wheat-
(a) Rs. 250 (b) Rs. 300
(c) Rs. 350 (d) Rs. 400
267. A man annouces 25% discount on the marked price of a bicycle and still makes a profit of 20%. If he had bought it for Rs. 1200. Find the marked price of bi-cycle -
(a) Rs. 1500 (b) Rs. 1920
(c) Rs. 2000 (d) Rs. 1800
268. A trader sells one type of sugar at 10 rupees per kg. and suffered a loss of 20%. While he sells the other type of sugar at Rs. 15 per kg. and makes a profit of 25%. Now he mixes both type of sugar in equal proportion and sells the mixture at 18 rupees per kg. Find his profit and loss now -
(a) $46\frac{3}{49}\%$ (b) $47\frac{3}{49}\%$
(c) $47\frac{46}{49}\%$ (d) $46\frac{46}{49}\%$
269. A man bought a table and a chair for Rs. 2000. He sold table at 20% profit and chair at 30% profit, in this way he makes a profit of 23% on the whole transaction. Find the cost price of table.
(a) 1500 (b) 600
(c) 1400 (d) 1250.
270. The printing cost of a book depends upon two factors- one is fixed cost and the other is variable cost which depends upon number of books printed. Publisher wants to earn 20% profit and according to his assumption 500 copies of the book of marked price 2 rupees will be sold in 3 month and 1000 copies will be sold in 9 months, Then find his profit, If he prints 4830 copies which will be sold in 50 months.
(a) 1932 (b) 1864
(c) 1610 (d) 1750
271. A producer of patent medicine gives a discount of 25% and a dozen bottles free on a order of 12 dozen bottles of medicine. If the marked price of a bottle be 113 rupees then find the minimum price of a bottle at which selling the medicine there is no loss to the producer.
(a) ₹ 77.82 (b) ₹ 78.23
(c) ₹ 79.64 (d) ₹ 80
272. A fruit seller bought 72 fruits at the rate of ₹ 8 per dozen. In all 12 fruits got rotten and the remaining he sold at the rate of ₹ 15 per dozen. Find his profit percentage.
(a) $33\frac{1}{3}\%$ (b) 50%
(c) $62\frac{1}{2}\%$ (d) $56\frac{1}{4}\%$
273. A shopkeeper bought 25 metres cloth for ₹ 20 and he sold 20 metres cloth for ₹ 25. Find the profit or less percentage.
(a) $56\frac{1}{4}\%$ profit
(b) $56\frac{1}{4}\%$ loss
(c) $33\frac{1}{3}\%$ profit
(d) $33\frac{1}{3}\%$ loss
274. A shopkeepr bought some pen at the rate of 16 pens for ₹ 25 and he sold all of them at the rate of 5 pens for ₹ 12. In this way he got a profit of ₹ 134. Find the number of pens bought also find the profit percentage.
(a) $54\frac{1}{4}\%$, 160
(b) $59\frac{1}{4}\%$, 80
(c) $62\frac{1}{2}\%$, 80
(d) $53\frac{3}{5}\%$, 160



275. A person sold a radio for ₹ 600 and made a profit equal to $\frac{1}{5}$ of selling price. At what rate should the person sell the radio to earn a profit of $\frac{5}{8}$ of cost price?
- (a) ₹ 800 (b) ₹ 780
(c) ₹ 980 (d) ₹ 720
276. A machine when was sold at 1230 the seller incurred a loss of 18%. If he wants to make a profit of $6\frac{1}{4}\%$ at what rate he must sell the machine?
- (a) ₹ 1600 (b) ₹ 1593.75
(c) ₹ 1590 (d) ₹ 1650
277. A cow was sold at 15% profit. If it was sold for ₹1200 less the seller incurred a loss of 5%. If he want to make a profit of $12\frac{1}{2}\%$ at what rate he must sell it?
- (a) ₹ 7000 (b) ₹ 9000
(c) ₹ 6750 (d) ₹ 7250
278. A trader marked the price 40% higher than the cost price of some articles. He sold half of them at marked price, one-fourth at 15% discount and the remaining at 30% discount. Find the profit percentage of the trader.
- (a) $16\frac{2}{3}\%$ (b) $24\frac{1}{4}\%$
(c) $14\frac{2}{7}\%$ (d) 16%
279. The list price of t.v is 6400 rupees and is sold to a retailer at two successive discount of 25% and 15% respectively. The retailer wants to print a price at the t.v in such a way that after allowing a discount of 10% at new marked price he can earn 20% profit. Find the new marked price.
- (a) ₹ 6000 (b) ₹ 8000
(c) ₹ 5400 (d) ₹ 5440
280. The list price of a fan is ₹ 800. But it was sold for 612 after giving two successive discount one of 10% and other is not known. Find the second discount.
- (a) 25% (b) 20%
(c) 15% (d) $23\frac{1}{2}\%$
281. Marked price of a fridge is ₹15000. It was sold after giving two successive discount of 20% and 10%. A person who bought it spend 10% of the cost price to repair it. If he wants to make 20% profit at what rate should he sell the fridge.
- (a) ₹14625 (b) ₹14265
(c) ₹14256 (d) ₹14500
282. The list price of a watch is ₹5100. If this watch was sold at 25% discount. The person who bought it spent ₹200 more on it, and now he sold the watch at list price. Find his profit or loss percentage.
- (a) $26\frac{114}{161}\%$ (b) $26\frac{47}{161}\%$
(c) 26% (d) 30%
283. When a shopkeeper sells first type of wheat at ₹ 3 per kg he incurred a loss of 20% and when he sells second type of wheat at 5 rupees per kg he made a profit of 25%. He mixes both types of wheat in equal proportion and sells the mixture at ₹ 6 per kg. Find his profit or loss.
- (a) $55\frac{5}{31}\%$ (b) $54\frac{22}{31}\%$
(c) $54\frac{26}{31}\%$ (d) $55\frac{1}{5}\%$
284. A publisher published 2000 copies of a book for ₹ 2400. His distributed 500 copies free. He gave a discount of 25% on the marked price and also announced a scheme that he would give a book free on the purchase of 24 books. In this way he sold all the books. If the marked price of book be ₹ 3.25 find his profit or loss.
- (a) $46\frac{1}{4}\%$ (b) $47\frac{2}{3}\%$
(c) $45\frac{1}{5}\%$ (d) $46\frac{2}{3}\%$
285. A man bought some articles and spent 4% of the cost price on the transportation. But the circumstances made him sell all the articles at 5% loss. If he had sold them for ₹ 32.5 more he would have gained 2.5% profit. Find cost price of the articles.
- (a) 416.66 (b) 415.66
(c) 421.66 (d) 414.66
286. The printing cost of first 2000 copy of a book is Rs 1000 and the next 2000 copies were printed at the rate of 200 copies per 50 rupees and the next 1000 copies were printed at the rate of 200 copies per 20 rupees. Find the printing cost of 2500 and 4300 copies respectively.
- (a) 1150, 1530 (b) 1125, 1530
(c) 1125, 1550 (d) 1150, 1550
287. A person bought a horse and a cart for 5000 rupees. He sold horse at 20% profit while the cart at 10% loss in all he was able to make a profit of 2%. Find the difference of cost price of the horse and cart.
- (a) 0 (b) 3000
(c) 2000 (d) 1000
288. A man bought 40 watches and marked a tag price above 25% of the cost price. He started to give 10% discount for the cash payment and 5% discount for others. He sold $\frac{3}{4}$ of the stock in cash payment. If he earned 2250 rupees as a profit, find the cost of each watch.
- (a) 400 (b) 600
(c) 500 (d) 700
289. The selling price of a tape recorder is Rs 1200. A shopkeeper sold it after making a profit equal to $\frac{1}{5}$ of the selling price. If the had sold it having a loss equal to $\frac{1}{5}$ of the selling price then find the difference of mathematical value of profit and loss in both the conditions.
- (a) 0% (b) 5%
(c) $8\frac{1}{3}\%$ (d) 10%



290. A man sold a watch at 20% profit. Had he bought at 10% less and sold it at 75 rupees less, he would

have earned $\frac{1}{6}$ of the new cost price. If he wants to make a profit of 40% at initial cost price then find the selling price of the watch.

- (a) Rs 1400 (b) Rs 700
(c) Rs 525 (d) Rs 800

291. If a fan is sold for 1500 rupees it makes profit while selling it for 900 rupees a man incurred a loss. If the profit is equal to $\frac{1}{3}$ of the loss then find the profit percentage when it is sold for 1400 rupees.

- (a) 4% (b) $3\frac{19}{72}\%$
(c) $3\frac{3}{4}\%$ (d) $3\frac{19}{27}\%$

292. A trader bought 60 quintal rice at 800 rupees per quintal. He sold 20 quintal rice at 10% profit while 25 quintal rice at 10% loss. At what rate must he sell the remaining quantity of rice so that he may earn a profit of 25% on the whole transaction :

- (a) Rs $1626\frac{1}{3}$ per quintal
(b) Rs $1626\frac{2}{3}$ per quintal
(c) Rs $1662\frac{1}{3}$ per quintal
(d) Rs $1662\frac{2}{3}$ per quintal

293. Rakesh Yadav bought some rice for 1650. $\frac{1}{3}$ rd of the rice got spoiled so this part was sold at 10% loss. At what profit the remaining must he sell to get a profit of 20% on the whole.

- (a) 35% (b) 30%
(c) 38% (d) 50%

294. A cloth trader gives a 10% discount at the marked price. Find the marked price of a saree costing 900 rupees so that after allowing discount he may earn 20% profit.

- (a) Rs 1300 (b) Rs 1500
(c) Rs 1200 (d) Rs 100

295. A man bought 80 eggs at the rate of 24 rupees per dozen 10 eggs got broken and the remaining eggs he sold at 3.20 rupees per egg. If he had spent 16 rupees on other expenses, find his profit or loss percentage.

- (a) $22\frac{2}{9}\%$ (b) $27\frac{3}{11}\%$
(c) $27\frac{2}{9}\%$ (d) $22\frac{3}{11}\%$

296. Rohit allows a discount of 25% on the advertise price and earn a profit of 20%. What should he mark the price of an article so that he may earn Rs 1801 rupees ?

- (a) Rs $14480\frac{2}{3}$
(b) Rs 16909
(c) Rs 14408
(d) Rs 16209

297. A trader bought a radio and spent 10% on transportation. If after giving a discount of 10% he wants to make a profit of 10% find what percent above the cost price he has marked the price of the radio.

- (a) $33\frac{1}{3}\%$ (b) $34\frac{4}{9}\%$
(c) $34\frac{5}{9}\%$ (d) None of these

298. A shopkeeper bought 20 t.v. sets for 5000 rupees per t.v. and also paid a tax at the rate of 10% and spent 5% for the transportation. He want to mark the price of each t.v. in such a way that after allowing a discount of 25% he may earn 20% profit. Find the marked price of each t.v.

- (a) 10200 rupees
(b) 9200 rupees

- (c) 9900 rupees
(d) 9222 rupees

299. When a book is sold for 96 rupees the mathematical value of profit percentage is equal to the cost price of the book. Find the cost price of the book.

- (a) 70 rupees
(b) 80 rupees
(c) 48 rupees
(d) 60 rupees

300. A fruit seller buys some fruit at 20 rupees per dozen and some other types of fruit at 15 rupees per dozen in the ratio of 1 : 3 respectively. If he sells all type of fruit after mixing them altogether at 12 rupees per dozen, find his profit or loss percentage.

- (a) $15\frac{5}{13}\%$ (b) $23\frac{1}{13}\%$
(c) $26\frac{2}{13}\%$ (d) $26\frac{3}{13}\%$

301. A whole sale trader bought 20 radio for 1200 rupees per radio and he spent Rs. 25 per radio on 10 radioes. and spent 150 rupees on transportation of all he then sold all of them at 20% profit to the retailer. If the retailer wants to make 25% profit then at what rate per radio must he sell them to customers ?

- (a) Rs. 2000 (b) Rs. 1830
(c) Rs. 1750. (d) Rs. 1600

302. A trader bought first type of rice at 16 rupees per kg and that of second type at 28 rupees per kg. He then mixed both type of rice and sold at 20 rupees per kg. having a loss of 10%. In what proportion he mixed the two types ?

- (a) 9:11 (b) 13:15
(c) 15:17 (d) 13:14

303. Vijay bought 20 type writer at Rs. 3500 per piece. He paid 10% tax of the cost price. He wants to make a profit of 25% and also wants to give a 10% discount on marked price. Find approximately how much discount he allows?

- (a) 10,000 (b) 11,550
(c) 10,695 (d) 11,380



304. Nootan sells her watch for 3000 rupees then she earns a profit while selling it for 2400 rupees she incurred a loss. Her profit is $66\frac{2}{3}\%$ of the loss. Find her profit percentage -
- (a) $8\frac{6}{23}\%$ (b) $8\frac{16}{32}\%$
 (c) $8\frac{16}{23}\%$ (d) $8\frac{2}{3}\%$
305. Bhuvnesh sold a radio at 8% loss. Had he bought it at 10% less and sold at 20% profit, he would have gained 5120 rupees more than before. Find the initial cost price of the radio.
- (a) Rs. 36000 (b) Rs. 3200
 (c) Rs. 45000 (d) Rs. 32000
306. Rakesh yadav sold two calculators having selling price K rupees each. On first he earned a profit of 30% and while on other he suffered a loss of 30% find his profit or loss percentage also find the amount of loss/profit.
- (a) no profit no loss,
 (b) 9% loss, $\frac{18}{91}K$
 (c) 9% loss, $\frac{23}{91}K$
 (d) 9% loss, $\frac{9}{91}K$
307. Neetu bought a radio and a watch for 6000 rupees. she sold radio at 10% loss and watch at 15% profit. In this way there was no loss and no profit at all. Find the difference between the cost price of radio and watch.
- (a) Rs. 2000 (b) Rs. 1200
 (c) Rs. 1800 (d) Rs. 1000
308. Rosy bought two articles for 4200 rupees. on one she made a profit of 30% while on other she suffered a loss of 20% and she found that the selling price of both became same If she had sold the article on which she made profit, for Rs. 3000 what would have been her profit percentage.?
- (a) $16\frac{13}{14}\%$ (b) $12\frac{13}{14}\%$
 (c) $12\frac{13}{12}\%$ (d) $12\frac{9}{12}\%$
309. Dinesh bought some fruits at the rate of 12 for Rs. 25 and the same number of other type at the rate of one score for Rs. 32. After mixing he sold them at the rate of a score for Rs. 40 If he as earned 760 rupees find the number of fruits he bought (1 score = 20)
- (a) 3600 (b) 3750
 (c) 4800 (d) 5000
310. A man bought a horse and a camel. He sold horse at 20% profit and camel at 10% loss and in this way he made neither profit nor loss. Had he sold the horse at 5% loss and camel at 5% profit he would have earned 600 rupees. Find the cost price of horse and came.
- (a) 12000, 24000
 (b) 10000, 20000
 (c) 12000, 18000
 (d) 18000, 36000
311. A bought an article for Rs. 4000. He sold it to B at 10% loss and B sold it to C at 10% profit and finally C sold it to D at 20% profit. Find the difference of the costs at which D bought the article and at which A bought the article.
- (a) 800 (b) 725
 (c) 752 (d) 767
312. A fruit seller bought 9 dozen bananas at 15 rupees per dozen out of which 20 bananas got rotten. He also bought other type of 8 dozen bananas at 10 rupees per dozen in which 30 bananas got rotten. At what rate should he sell the remaining bananas so that he may get 20% profit at all?
- (a) Rs. 21.10 per dozen
 (b) Rs. 25 per dozen
 (c) Rs. 20.10 per dozen
 (d) Rs. 20.08 per dozen
313. I bought some lemons at 18 for RS. 1 and sold them at 20% profit. If I sell them at 10% loss then find the difference of number of lemons sold for 24 rupees in both the condition.
- (a) 120 (b) 150
 (c) 170 (d) 190
314. A company gives a 25% discount on the list price of its products and made a 25% profit. Sometime later company increases its production cost by 10% and issue a new list price which is 25% more than the previous one. If the company continues to allow the discount as before, find the profit percentage at new cost price.
- (a) $42\frac{1}{22}\%$ (b) 42%
 (c) $42\frac{13}{22}\%$ (d) 43%
315. A man bought some articles. He sold $\frac{1}{3}$ part at 12% profit, $\frac{2}{5}$ part at 15% profit and the reamaining at 24% loss find his profit or loss on the whole transaction .
- (a) $3\frac{2}{5}\%$ (b) $3\frac{5}{3}\%$
 (c) 3.68% (d) $3\frac{3}{5}\%$
316. A producer marks the price 80% above the cost price on the article produced by him. He gives a 20% discount to the customers purchasing it for cash payment and a discount of 15% to the customers paying in installment and 10% discount to the customers other than cash payment and installment paying. He sold $\frac{1}{3}$ of the articles to the customer paying cash payment for the article $\frac{2}{5}$ th the installment payers and remaining to the customers who pays in other mode. If all the produced articles were sold find his profit percentage.
- (a) $52\frac{3}{5}\%$ (b) $52\frac{2}{5}\%$



- (c) $53\frac{2}{5}\%$ (d) $53\frac{3}{5}\%$
317. A man bought a piece of land for Rs. 72000. he sold $\frac{1}{3}$ of the part at 20% loss and $\frac{2}{3}$ of the remaining at 25% profit. At what rate should he sell the remaining portion to earn a 20% profit on the whole land .?
- (a) Rs. 27200 (b) Rs. 29200
(c) Rs. 30000 (d) Rs. 27500
318. Chandan sold three radio at Rs. 10800, Rs. 6600 and Rs. 10500 respectively. He earned 20% profit at first 10% profit at second and 5% profit at third. If he wants to earn $12\frac{1}{2}\%$ profit on the sale of all three radio find for how many rupees all three are to be sold ?
- (a) Rs. 30,000 (b) Rs. 28125
(c) Rs. 32,500 (d) Rs. 27250
319. A trader comes to patna from Delhi to purchase some articles. The cost of the article in patna is 10% less than that in Delhi. He spends 300 rupees on extra expenses and sells the articles in Delhi making a profit of 480 rupees. find the rate of the article in patna.
- (a) Rs. 1720
(b) Rs. 7200
(c) Rs. 7020
(d) Rs. can't be determined
320. A trader mixes three types of tea in the ratio 4:3:5 costing 15 rupees kg. 20 rupees per kg. and 30 rupees per kg. respectively. Its sells the mixture at 25 rupees per kg. find his profit percentage.
- (a) $11\frac{1}{9}\%$ (b) $9\frac{1}{11}\%$
(c) 10% (d) None of these
321. Alok bought 240 rims paper at the rate of 3200 rupees per rim. He spend 1080 rupees on the transporation and paid a sales tax at the rate of 80 paise per rim He paid 200 rupees to porter and got made 2400 books of all the paper To earn a profit of 40% what should be the marked price of each book (approximately) ?
- (a) 450
(b) 449
(c) 445
(d) None of these
322. A man bought 40 liters milk at 12 rupee per litre. He spent 20 rupees and got made 8 kg. cream and 36 litres toned milk. He sold cream at 60 rupees per kg and toned milk at 6 rupees per litre. Find his profit percentage
- (a) 39.80% (b) 39.08%
(c) 40% (d) 39.20%
323. A man suffered 20% loss on first investment, and made 10% profit at second investment and $12\frac{1}{2}\%$ profit on the third investment. If the invested amount be in the ratio of 4:5:3 find his profit percent-age.
- (a) .375% (b) .50%
(c) .625% (d) .75%
324. A producer produces a particular item and sells it at 90 rupees per item. He has to pay 60 rupees per item for raw material and labourers. The factory where the item is produced runs at a cost 6000 rupees per week. If the producer wants to make a profit of Rs. 3000 per week how many items should he produce per week ?
- (a) 100 (b) 300
(c) 500 (d) 1000
325. Prem bought 240 tables at the rate 320 rupees per table In all he sold 90 table at the profit of 30 rupees per table, 120 tables at the profit of 20 rupees per table and remaining he sold at the loss of 30 rupees per table. Find his profit in rupees.
- (a) 4200 (b) 4250
(c) 4500 (d) 4000
326. A shopkeeper allows 20% discount on the marked price of a watch and sells it for 960 rupees. If he gives no discount his profit is 40% If he wants to make 54% profit what should be the selling price of the watch.
- (a) 1540 (b) 1320
(c) 1288 (d) 1600
327. A whole sale trader allows a discount of 100 rupees and still makes 25% profit. If the cost of the radio be 1600 rupees and he sells it at marked price find his profit percentage.
- (a) $33\frac{1}{3}\%$ (b) $31\frac{1}{4}\%$
(c) $37\frac{1}{2}\%$ (d) 32%
328. A producer decides the marked price of an electric iron adding local production cost tax (30% of the production cost)and profit (20% of the production cost). The whole seller sells it to retailer at 20% profit while retailer sells it to customer for Rs. 207 making 15% profit find the local production cost tax and production cost of the electric iron.
- (a) 30,100 (b) 15, 50
(c) 21, 70 (d) None of these
329. A man bought a table after getting two successive discount of 20% and 10% respectively . The marked price of the table was 600 rupees. and he spend 10% of the buying price on transportation. At what rate should he sell the table to get a 15% profit ?
- (a) 546.48 (b) 564.48
(c) 546.84 (d) Nonw of these
330. Total capital of a company is 9000 rupees its annual sale is 3750 rupees. Cost of raw material is 35% of annual sale 386 rupees were paid for transportation and tax 940 rupees are spent on advertisement, 136 are spent in the form of office expenses, 200 are given to director as salary. The director gets 1% extra of the annual sale. If the advertisement cost be doubled and the annual sale also increases by 40% then by how many rupees will the annual profit increase ?



- (a) Rs. 10
(b) Rs. 20
(c) No increase
(d) can't not be dertermined
331. A trader calculates his profit on C.P. while the second calculates on S.P. They both sold their commodities at 3760 rupees each and both claim $17\frac{1}{2}\%$ profit. Find the difference of the actual profit earned by them.
(a) 92 (b) 98
(c) 96 (d) 100
332. A contractor thinks that he will get 8400 rupees for completion of a work. This amount, includes raw material cost, labour cost and 5% profit. Cost of raw material and labour is in the ratio of 3:7 When he starts the work he finds that there is a increase of 10% on raw material and 15% on labour cost find his loss now.
(a) 7.94% (b) 8%
(c) 7.89% (d) 7.49%
333. If a person sells an article at 10% profit instead of 5% loss he gets Rs. 75 more find the cost price of the article.
(a) Rs. 1500 (b) Rs. 500
(c) Rs. 750 (d) Rs. 1000
334. A man sold two horses for Rs. 32500 each. He earned a profit of 15% an the first horse while incurred a 15% loss on the second horse. find his total loss or profit percentage during whole transaction.
(a) 27.75% profit
(b) 22.5% loss
(c) No profit No loss
(d) 2.25% loss
335. If the cost price of 15 articles is equal to the selling of 12 articles find the profit percentage.
(a) 25%
(b) 5%
(c) 20%
(d) Cannot be determined.
336. A fruitseller bought some bananas at the rate of 6 for Rs. 15 and sold all at the rate of 4 for Rs. 12. Find his profit or loss percentage.
(a) 10% (b) 20%
(c) 2% (d) 25%
337. A shopkeeper marked his goods 20% above the cost price and allows a discount of 10% on the marked price. Find his profit percentage.
(a) 8% (b) 10%
(c) 12% (d) none of these
338. Three suecessive discounts of 20%, 10% and 5% is equivalent to a single discount.
(a) 35% (b) 33.60%
(c) 31.60% (d) 29.60%
339. The marked price of a shirt is Rs. 600. After giving two successive discounts it was sold for Rs. 432. If the second discount be 10% find the first discount.
(a) 18% (b) 22%
(c) 20% (d) 25%
340. A man earned $\frac{1}{10}$ of the cost price of book by selling it for Rs. 891. Find the cost price of the book.
(a) 850 (b) 800
(c) 810 (d) None of these
341. Vinod earned a profit of Rs. 110 while selling some pencils at the rate of Rs. 2.50 per pencil and incurred a loss of Rs. 55 on selling same number of pencils at the rate of Rs. 1.75 per pencil. How many pencils did the Vinod have ?
(a) 220
(b) 240
(c) 200
(d) can't be determined
342. A man bought a horse and a cart for Rs. 20,000. He sold horse at 20% profit and cart at 10% loss. In this way he got a profit of 2% find the cost price of horse.
(a) 7,000 (b) 10,000
(c) 8,000 (d) 9,000
343. A sold an article to B at 15% profit and B Sold it to C at 10% loss . If C has paid Rs. 517.50 for the article. Find the cost at which A bought it ?
(a) 500 (b) 700
(c) 200 (d) 1000
344. An article is sold at $\frac{2}{3}$ of its fixed price and the seller incurred 10% loss. If the article is sold at it fixed price find the profit percentage of the seller.
(a) 20% (b) 10%
(c) 35% (d) 2%
345. A shopkeeper sold sugar in such a manner that the cost price of 1 kg. sugar is equal to the selling price of 950 gm. sugar. Find his profit percentage.
(a) $5\frac{5}{19}\%$ (b) $5\frac{1}{5}\%$
(c) 5% (d) $4\frac{1}{19}\%$
346. A shopkeeper bought 144 eggs at the rate of Rs. 1per egg. But 20 eggs got broken on the way and he sold the remaining at the rate of Rs. 1.20 per egg. Find his profit or loss.
(a) $3\frac{1}{3}\%$ (b) $3\frac{1}{2}\%$
(c) $3\frac{1}{1}\%$ (d) $3\frac{4}{5}\%$
347. A man earns a profit equal to the selling price of 13 dozen mangoes when he sells 39 dozen mangoes. Find his profit percentage.
(a) 30% (b) 20%
(c) 70% (d) 50%
348. A dishonest shopkeeper sells his goods at the cost price and earns a profit of $11\frac{1}{9}\%$ by using false weight. Find how much he weighs instead of 1 kg. ?
(a) 850 gm (b) 950 gm
(c) 990 gm (d) 900 gm
349. The profit made on an article selling at 900 is double than the loss incurred when the article is sold for Rs. 600. find the cost price of the article.



- (a) Rs. 240 (b) Rs. 200
(c) Rs. 700 (d) Rs. 100
350. A shopkeeper sold his chair at $2\frac{1}{2}\%$ loss. If he had sold it for Rs. 100 more, he would have earned $7\frac{1}{2}\%$ profit. To earn a profit of $12\frac{1}{2}\%$ what should be the selling price of the chair ?
(a) Rs. 1000 (b) Rs. 1225
(c) Rs. 1525 (d) Rs. 1125
351. out of total 100 articles half were sold at 20% profit and the remaining were sold at 40% profit. Had all articles were sold at 25% profit, there would have a profit of Rs. 100 less than before. Find cost price of each article.
(a) Rs. 50 (b) Rs. 10
(c) Rs. 30 (d) Rs. 20
352. A man sold an article at 10% loss. Had he bought it at 20% less and sold it for Rs. 55 more, he would have earned 40% profit find the cost price of the article.
(a) Rs. 200 (b) Rs. 150
(c) Rs. 250 (d) Rs. 75
353. A shopkeeper bought an electric iron and sold it at 10% profit. Had he bought it at 10% less and sold it for Rs. 16.50 less, he would have earned 10% profit. Find the cost price of the electric iron.
(a) Rs. 100 (b) Rs. 150
(c) Rs. 80 (d) Rs. 30
354. A shopkeeper allows a discount of 5% on the marked price of the items and he makes a profit of 10%. If the cost price of an item be Rs. 95 then find its marked price.
(a) Rs. 50 (b) Rs. 110
(c) Rs. 20 (d) Rs. 10
355. Naresh bought a t.v. set for Rs. 11250 after getting a discount of 10%. He spent Rs. 150 on the transportation and Rs. 800 to get it fit. At what rate must he sell the t.v. set to earn a profit of 15% percent without allowing any discount ?
(a) Rs. 13030 (b) Rs. 14030
(c) Rs. 10200 (d) Rs. 13020
356. The marked price of a shirt and a pant are in the ratio of 1:2. A shopkeeper allows 40% discount on shirt and 30% discount on the both pant shirt together. Find the discount percentage given on the pant.
(a) 20% (b) 10%
(c) 25% (d) 40%
357. A shopkeeper marks his goods 20% above the cost price. If he allows a discount of Rs. 31.20 over a bill of Rs. 312. Find his profit percentage.
(a) 8% (b) 2%
(c) 5% (d) 9%
358. A shopkeeper bought 150 calculators for Rs. 250 each. He spent Rs. 2500 on transportation and packaging. If he marks Rs. 320 for each calculator and also allows a discount of 5% find his profit percentage.
(a) 12% (b) 14%
(c) 8% (d) 10%
359. A shopkeeper sold a T.V. set for Rs. 17940 after giving a discount of 8% and he made a profit of 19.6%. If he had not given any discount find his profit percentage.
(a) 10% (b) 5%
(c) 7% (d) 30%
360. A shopkeeper bought a watch for Rs. 960 and sold at 20% profit. One day he sold the watch to his customer at 20% profit but he calculated the profit at selling price at which he used to sell before. Find how many rupees the customer paid for the watch this time ?
(a) Rs. 1090.3
(b) Rs. 1190.40
(c) Rs. 1180.3
(d) Rs. 1090.40
361. If an article is bought at the $\frac{3}{4}$ of the fixed price and marked 40% above the fixed price and then the discount of 20% is allowed then find the profit percentage ?
(a) $49\frac{2}{3}\%$ (b) $40\frac{2}{3}\%$
(c) $49\frac{1}{3}\%$ (d) $30\frac{2}{3}\%$
362. A shopkeeper marks his goods at 60% higher than the cost price. He sold $\frac{3}{5}$ of the articles at cost price and remaining at 20% discount. Find his profit percentage.
(a) 10.10% (b) 5.7%
(c) 15.8% (d) 11.20%
363. A man had two options of getting successive discount of 10%, 10% and 30% and the second of 40%, 5% and 5% respectively on the item of cost Rs. 5000. How much he can save by choosing the better option ?
(a) Rs. 120.30 (b) Rs. 127.50
(c) Rs. 102.30 (d) Rs. 125.42
364. I bought some oranges at the rate of 4 for Rs. 1. In all I kept fifth part of the oranges to me and sold the remaining at the rate of 3 oranges for Rs. 1 and I earned 1 rupee. How many oranges I bought ?
(a) 20 oranges (b) 30 oranges
(c) 15 oranges (d) 60 oranges
365. There are two shirts and price of one is 100 more than that of other. If the dearer shirt is sold at 10% profit and the cheaper one at 10% loss then find the loss or profit on whole the transaction.
(a) Rs. 5 (b) Rs. 10
(c) Rs. 2 (d) Rs. 3
366. Sankar bought a watch after getting two successive discounts of 30% and 10% respectively. and in this way he got a discount of Rs. 444. At what cost must he sell the watch to earn a profit of 40%.
(a) 1057.40 (b) 1058.40
(c) 905.80 (d) 1158.30



367. A sum of money was invested in such a way that there was a profit

of 5% at $\frac{1}{3}$ part, 7% profit at $\frac{1}{5}$ part and a loss of 10% on the remaining. Find the loss or profit percentage on whole investment.

- (a) 1.2% (b) -1.6%
(c) 1.1% (d) -1.5%

368. A bookseller sells his books at 10% profit. If he buys it at 4% less and sells it for 60 paise more.

he will earn $18\frac{3}{4}\%$ profit. At what rate the book seller bought the book?

- (a) 12 Rupees (b) 18 Rupees
(c) 10 Rupees (d) 15 Rupees

369. A trader allows 4% discount on the marked price and gives 1 article free on the purchase of 15 articles and still earns 35% profit. how much percentage above the cost price is the marked price?

- (a) 20% (b) 10%
(c) 50% (d) 30%

370. The profit earned by selling a radio for Rs. 1400 is Rs. 25 more than the loss occurred on selling the radio for Rs. 1025. Find radio's cost price.

- (a) 1000 (b) 900
(c) 1200 (d) 1500

371. Selling a photo for Rs. 48.

Ramesh earned $\frac{1}{5}$ part of the cost price. If he sells it for Rs. 38, find his profit or loss percentage.

- (a) 2% (b) 5%
(c) 4% (d) 1%

372. Sonu bought some lemons at the rate of 5 for Rs. 1 and other type of lemons at the rate of 8 for Rs. 1 in the same number. To earn a profit of 60% at what rate per dozen must he sell the lemons?

- (a) Rs. 2.02 (b) Rs. 1.02
(c) Rs. 3.12 (d) Rs. 5.02

373. Heeralal bought two cycles for Rs. 4100 and sold one at 20% profit and other at 15% loss. If the selling price of both the cycles be same. Find the selling price of each cycle.

- (a) Rs. 1041 (b) Rs. 2040
(c) Rs. 1312 (d) Rs. 1204

374. Ram bought a watch and sold it to Shyam at 10% profit. Shyam sold it to Mohan at a profit of 120 rupees and Mohan sold it to Morari at same profit rupees as the Ram sold it to Shyam. If Morari had paid Rs. 1080, find at what rate Ram bought it?

- (a) 700 (b) 800
(c) 350 (d) 400

375. Sangita bought a flat for Rs. 5 lakh and sold it to Geeta at 20% loss. Geeta sold it to Sangita at 20% profit. Find the result during the whole transaction.

- (a) Rs. 80,550
(b) Rs. 75,000
(c) Rs. 70,000
(d) Rs. 80,000

376. A cow is sold at 10% loss. If it is bought at 20% more and is sold for Rs. 426 less there will be a loss of 30%. At what rate should the cow be sold to earn the profit of Rs. 240 rupees.

- (a) Rs. 7040 (b) Rs. 4040
(c) Rs. 7340 (d) Rs. 1202

377. When an article is sold for Rs. 96 instead of 80, the profit percentage triples. If the same article is sold for Rs. 90 then what will be the profit percentage?

- (a) 20% (b) 25%
(c) 5% (d) 10%

378. The selling price of an item is fixed. If it is sold at the $\frac{3}{4}$ of the fixed price there would have been a loss of $16\frac{2}{3}\%$. Find the profit percentage when it is sold at $\frac{6}{5}$ of the fixed price.

- (a) $33\frac{1}{3}\%$ (b) $20\frac{1}{2}\%$
(c) $15\frac{2}{2}\%$ (d) $2\frac{2}{2}\%$

379. A trader sold his $\frac{4}{5}$ of the stock at 15% profit and the remaining at 10% loss. If he earned Rs. 45 in the whole transaction, find the total cost price of his stock.

- (a) Rs. 450 (b) Rs. 350
(c) Rs. 300 (d) Rs. 200

380. The cost price of a calculator and a watch is Rs. 850. If the watch is sold at 15% profit and the calculator at 10% loss, then he earned a profit of 5% on the whole transaction. Find the cost of watch.

- (a) Rs. 510 (b) Rs. 300
(c) Rs. 200 (d) Rs. 150

381. The profit earned on selling a shirt for Rs. 1135 is 12.5% more than the loss occurred on selling it for Rs. 880. If the shirt is sold 12% above the cost price, how many rupees can be earned?

- (a) Rs. 100 (b) Rs. 150
(c) Rs. 80 (d) Rs. 120

382. A wheat trader bought some quantity of rice for Rs. 6400. He

sold $\frac{2}{5}$ at 5% loss and remaining at 15% profit. Find his total profit or loss percentage.

- (a) 7% (b) 2%
(c) 5% (d) 9%

383. The list price of a computer is Rs. 48,000. Shopkeeper A sold it at three successive discounts 20%, 10% and 5% and the other shopkeeper 'B' sold it at three successive discounts of 19%, 8% and 8% on purchasing the computer from the first seller. How many rupees a person can save instead of purchasing it from the second one.

- (a) Rs. 72 (b) Rs. 67
(c) Rs. 73 (d) Rs. 76

384. A publisher gets printed 1200 copies of a book and distributes 300 copies free. After this he gives 2 copies free at the purchase of 18 copies. If the cost per copy be Rs. 60 then what should be the selling price of a book to earn 17% profit?



(a) Rs. 110

(b) Rs. 104

(c) Rs. 102 (d) Rs. 100

385. A heater was sold at the profit of $\frac{1}{12}$ of the selling price and made a profit of Rs. 120. If it is sold at

a loss of $\frac{1}{6}$ of the selling price.
find the loss percentage.
(approximately)

(a) 18% (b) 12%

(c) 15% (d) 20%

386. Madanlal sold one fourth of the rice stock at 20% loss due to rice soiled. At what rate about the cost price must he sell the remaining to earn 40% profit on the whole stock?

(a) 21% (b) 12%

(c) 60% (d) 14%

387. In the case of same marked price the three successive discount of 30%, 20% and 10% is equal to a single equivalent discount of $x\%$ while the another three successive discount of 15%, 25% and 20% is equal to a single equivalent discount of $y\%$. Then which one correct ?

(a) $x = y$ (b) $x > y$ (c) $x < y$

(d) can not be determined

ANSWER KEY

1. (c)	40. (c)	79. (d)	118. (b)	157. (c)	196. (a)	235. (b)	274. (d)	313. (a)	353. (b)
2. (a)	41. (c)	80. (d)	119. (a)	158. (b)	197. (b)	236. (d)	275. (b)	314. (a)	354. (b)
3. (b)	42. (a)	81. (c)	120. (a)	159. (c)	198. (b)	237. (a)	276. (b)	315. (d)	355. (b)
4. (a)	43. (b)	82. (c)	121. (a)	160. (b)	199. (c)	238. (d)	277. (c)	316. (b)	356. (c)
5. (c)	44. (b)	83. (a)	122. (d)	161. (a)	200. (b)	239. (a)	278. (b)	317. (a)	357. (a)
6. (a)	45. (c)	84. (a)	123. (b)	162. (d)	201. (a)	240. (c)	279. (d)	318. (b)	358. (b)
7. (a)	46. (a)	85. (a)	124. (a)	163. (c)	202. (c)	241. (a)	280. (c)	319. (c)	359. (d)
8. (a)	47. (b)	86. (a)	125. (d)	164. (b)	203. (c)	242. (b)	281. (c)	320. (a)	360. (b)
9. (d)	48. (c)	87. (d)	126. (b)	165. (c)	204. (c)	243. (d)	282. (a)	321. (b)	361. (c)
10. (a)	49. (d)	88. (a)	127. (b)	166. (a)	205. (a)	244. (d)	283. (c)	322. (d)	362. (d)
11. (b)	50. (c)	89. (a)	128. (c)	167. (b)	206. (a)	245. (a)	284. (a)	323. (c)	363. (b)
12. (a)	51. (b)	90. (a)	129. (a)	168. (b)	207. (b)	246. (b)	285. (a)	324. (b)	364. (d)
13. (a)	52. (c)	91. (a)	130. (d)	169. (c)	208. (c)	247. (c)	286. (b)	325. (a)	365. (b)
14. (b)	53. (b)	92. (a)	131. (b)	170. (c)	209. (b)	248. (c)	287. (d)	326. (b)	366. (b)
15. (d)	54. (c)	93. (a)	132. (d)	171. (d)	210. (c)	249. (d)	288. (a)	327. (b)	367. (b)
16. (a)	55. (b)	94. (a)	133. (d)	172. (d)	211. (a)	250. (d)	289. (c)	328. (a)	368. (d)
17. (b)	56. (b)	95. (a)	134. (a)	173. (b)	212. (b)	251. (b)	290. (b)	329. (a)	369. (c)
18. (a)	57. (a)	96. (a)	135. (b)	174. (a)	213. (c)	252. (d)	291. (d)	330. (c)	370. (c)
19. (b)	58. (c)	97. (a)	136. (c)	175. (c)	214. (b)	253. (a)	292. (b)	331. (b)	371. (b)
20. (c)	59. (c)	98. (a)	137. (d)	176. (a)	215. (a)	254. (d)	293. (a)	332. (d)	372. (c)
21. (d)	60. (d)	99. (a)	138. (a)	177. (a)	216. (d)	255. (d)	294. (c)	333. (b)	373. (b)
22. (b)	61. (a)	100. (a)	139. (b)	178. (d)	217. (b)	256. (a)	295. (b)	334. (d)	374. (b)
23. (a)	62. (d)	101. (a)	140. (a)	179. (c)	218. (c)	257. (d)	296. (c)	335. (a)	375. (d)
24. (c)	63. (b)	102. (a)	141. (a)	180. (d)	219. (c)	258. (b)	297. (b)	336. (b)	376. (c)
25. (c)	64. (c)	103. (b)	142. (d)	181. (b)	220. (a)	259. (d)	298. (b)	337. (a)	377. (b)
26. (a)	65. (a)	104. (c)	143. (d)	182. (b)	221. (d)	260. (c)	299. (d)	338. (c)	378. (a)
27. (c)	66. (b)	105. (a)	144. (b)	183. (c)	222. (a)	261. (d)	300. (c)	339. (c)	379. (a)
28. (a)	67. (b)	106. (a)	145. (a)	184. (a)	223. (a)	262. (d)	301. (b)	340. (c)	380. (a)
29. (c)	68. (c)	107. (d)	146. (a)	185. (c)	224. (c)	263. (a)	302. (d)	341. (a)	381. (d)
30. (d)	69. (d)	108. (d)	147. (a)	186. (c)	225. (a)	264. (c)	303. (c)	342. (c)	382. (a)
31. (b)	70. (b)	109. (d)	148. (b)	187. (a)	226. (c)	265. (d)	304. (c)	343. (a)	383. (d)
32. (a)	71. (a)	110. (b)	149. (a)	188. (b)	227. (c)	266. (b)	305. (d)	344. (c)	384. (b)
33. (c)	72. (c)	111. (c)	150. (d)	189. (b)	228. (b)	267. (b)	306. (b)	345. (a)	385. (a)
34. (d)	73. (a)	112. (d)	151. (b)	190. (a)	229. (c)	268. (d)	307. (b)	346. (a)	386. (c)
35. (c)	74. (b)	113. (c)	152. (c)	191. (c)	230. (c)	269. (c)	308. (c)	347. (d)	387. (b)
36. (a)	75. (c)	114. (d)	153. (c)	192. (c)	231. (d)	270. (c)	309. (c)	348. (d)	
37. (c)	76. (a)	115. (c)	154. (d)	193. (c)	232. (a)	271. (b)	310. (a)	349. (c)	
38. (d)	77. (b)	116. (d)	155. (c)	194. (b)	233. (b)	272. (b)	311. (c)	350. (d)	
39. (a)	78. (b)	117. (a)	156. (c)	195. (b)	234. (c)	273. (a)	312. (c)	351. (d)	
								352. (c)	

Solution

1. (c) Cost price (Shirt + trouser)
= Rs. 371

$$12\% = \frac{12}{100} = \frac{3}{25}$$

Let cost of Shirt = 25 units

$$\therefore \text{Cost of trousers} = (25 + 3) \\ = 28 \text{ units}$$

According to the question,
(25 + 28) units = Rs. 371

$$1 \text{ unit} = \frac{371}{53}$$

$$25 \text{ units} = \frac{371}{53} \times 25 = \text{Rs. 175}$$

2. (a) **Note** → A shopkeeper sells two items at the same price. If he sells one of them at a profit of $x\%$ and the other at a loss of $x\%$.

The result will always be a loss

$$\text{of } \left(\frac{x}{10}\right)^2 \%$$

Hence, Required loss

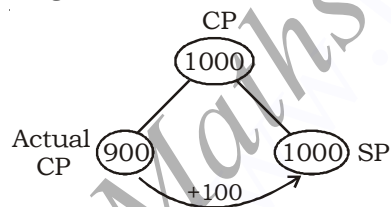
$$= \left(\frac{10}{10}\right)^2 \% = 1\%$$

3. (b) According to the question,
15 SP = 20 CP

$$\frac{\text{CP}}{\text{SP}} = \frac{15}{20} = \frac{3}{4}$$

$$\% \text{ profit} = \frac{1}{3} \times 100 = 33\frac{1}{3}\%$$

4. (a) Let the cost price of 1 gm weight is Re. 1.



$$\% \text{ profit} = \frac{100}{900} \times 100 = 11\frac{1}{9}\%$$

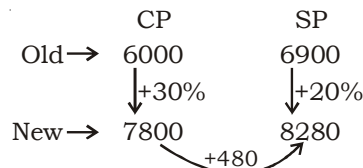
5. (c) $15\% = \frac{3}{20}$ CP = 20, SP = 23

According to the question,
23 units = Rs. 6900

$$1 \text{ unit} = 300$$

$$20 \text{ units} = 300 \times 20 = 6000$$

$$\text{CP} = \text{Rs. } 6000$$



$$\% \text{ profit} = \frac{480}{7800} \times 100 = 6.15\%$$

6. (a) $10\% = \frac{1}{10}$, $12\% = \frac{3}{25}$, 5%

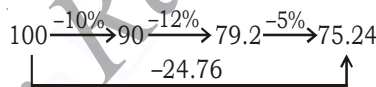
$$= \frac{1}{20}$$

Initial	Final
10	9
25	22
20	19
5000	3762

$$\% \text{ Discount} = \frac{1238}{5000} \times 100$$

$$= 24.76\%$$

Alternate → Let initial value
= 100



$$\text{Net discount} = 100 - 75.24 \\ = 24.76\%$$

7. (a) **Note** → In such type of questions start your calculation from the point at which the question can be solved easily.

$$20\% = \frac{1}{5}, \quad 10\% = \frac{1}{10}$$

CP	SP
5	6
10	9
10	11
500	594
↓ × 2	↓ × 2
1000	1188

$$\text{Money paid by Rakesh Yadav} \\ = (1000 - 110) = \text{Rs. 890}$$

Alternate:

Note → We can also take help from options to save our valuable time.

Option (a) → The cost price of the article = Rs. 890

After repairing total cost

$$= \text{Rs. } 890 + 110 = \text{Rs. } 1000$$

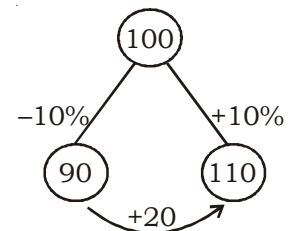
The amount at which charan sold the article

$$= 1000 \times \frac{120}{100} \times \frac{90}{100} \times \frac{110}{100} \\ = \text{Rs. } 1188$$

Note → Now the same price is given in question so option (a) is correct.

8. (a) Let the initial quantity of article is 100 gm and the cost price of 1 gm is Re. 1.

According to the question,



$$\% \text{ profit} = \frac{20}{90} \times 100 = \frac{200}{9}$$

$$= 22\frac{2}{9}\%$$

9. (d) Let Rakesh Yadav bought x oranges.

$$\text{Cost price per orange} = \frac{32}{x}$$

$$\text{profit} = 40 \times \frac{32}{x} = \text{Rs. } \frac{1280}{x}$$

To solve further we need value of x , so data is inadequate.

10. (a) SP of 1 articles = $\frac{15}{5} = \text{Rs. } 3$

$$\text{CP of 1 articles} = \frac{3}{120} \times 100$$

$$= \text{Rs. } 2.5$$

$$\text{CP of 8 articles} = 2.5 \times 8 = \text{Rs. } 20$$

$$\text{SP of 8 articles} = \text{Rs. } 18.4$$

$$\text{Loss} = (20 - 18.4) = \text{Rs. } 1.6$$

$$\% \text{ Loss} = \frac{1.6}{20} \times 100 = 8\%$$

11. (b) Cost price of the article = Rs. 2500

$$\text{Bribe} = \frac{2500 \times 10}{100} = \text{Rs. } 250$$

$$\begin{aligned}\text{Total Cost} &= 2500 + 250 \\ &= \text{Rs. } 2750\end{aligned}$$

According to the question,

$$\begin{aligned}(\text{We Know } 9.09 &= 9\frac{1}{11}) \\ \text{CP} &: \text{MP} \\ (100 - 25) &: \left(100 + 9\frac{1}{11}\right) \\ 75 &: \frac{1200}{11} \\ 33 &: 48 \\ \downarrow \times \frac{250}{3} & \quad \downarrow \times \frac{250}{3} \\ 2750 & \quad \boxed{4000}\end{aligned}$$

Marked price of the article
= **Rs. 4000**

$$\begin{aligned}12. (a) 10\% &= \frac{1}{10}, 20\% = \frac{1}{5}, 25\% \\ &= \frac{1}{4}\end{aligned}$$

	I	II	III
CP	$10_{\times 2}$	$5_{\times 3}$	$4_{\times 6}$
SP	$9_{\times 2}$	$6_{\times 3}$	$3_{\times 6}$
P/L	$-1_{\times 2}$	$+1_{\times 3}$	$-1_{\times 2}$

According to the question,
SP is same in both cases.
So Average CP

$$= \frac{(20 + 15 + 24)}{3} = \frac{59}{3}$$

Average SP

$$= \frac{(18 + 18 + 18)}{3} = \frac{54}{3}$$

Required percentage

$$= \frac{\left(\frac{59}{3} - \frac{54}{3}\right)}{\frac{54}{3}} \times 100 = \uparrow 9.256\%$$

$$\begin{aligned}13. (a) \text{CP} &= \frac{2400}{(100 + 25)} \times 100 \\ &= \text{Rs. } 1920 \\ \text{SP} &= \text{Rs. } 2040 \\ \text{Profit} &= 2040 - 1920 = \text{Rs. } 120 \\ \% \text{ profit} &= \frac{120}{1920} \times 100 = 6.25\%\end{aligned}$$

$$\begin{aligned}14. (b) \text{CP} &= \frac{935}{(100 + 10)} \times 100 \\ &= \text{Rs. } 850 \\ \text{SP} &= \text{Rs. } 810 \\ \text{Loss} &= 850 - 810 = \text{Rs. } 40\end{aligned}$$

$$\begin{aligned}15. (d) 16.66\% &= \frac{1}{6} \\ \text{CP} & \quad \text{SP} \\ 6 & \quad 5 \\ \downarrow \times 900 & \quad \downarrow \times 900 \\ 5400 & \quad 4500 \\ \text{New SP} &= 5703.75 \\ \text{Profit} &= 5703.75 - 5400 \\ &= \text{Rs. } 303.75 \\ \% \text{ profit} &= \frac{303.75}{5400} \times 100 \\ &= 5.625\%\end{aligned}$$

$$\begin{aligned}16. (a) \text{ Required selling price} \\ &= \frac{63}{(100 + 5)} \times (100 + 10) \\ &= \frac{63 \times 110}{105} = \text{Rs. } 66\end{aligned}$$

$$\begin{aligned}17. (b) \text{ Cost price of chocolates} \\ &= \frac{240}{12} \times 9 = \text{Rs. } 180 \\ \text{Selling price} &= 240 \times 1 = \text{Rs. } 240 \\ \% \text{ profit} &= \frac{(240 - 180)}{180} \times 100 \\ &= 33\frac{1}{3}\%\end{aligned}$$

$$\begin{aligned}18. (a) \text{ Sales tax} &= \frac{120}{5} = \text{Rs. } 24 \\ \text{Remainder} &= (120 - 24) = \text{Rs. } 96 \\ \text{Profit} &= 96 \times \frac{1}{3} = \text{Rs. } 32 \\ \text{Cost price} &= (96 - 32) = \text{Rs. } 64\end{aligned}$$

$$\begin{aligned}19. (b) \text{ According to the question,} \\ \text{CP} & \quad \text{SP} & \quad \text{MP} \\ 1000 & \quad 1080 & \quad 1200 \\ \therefore \text{CP} &= \frac{1200}{120} \times 100 = \text{Rs. } 1000 \\ \text{SP} &= 1200 \times \frac{(100 - 10)}{100} = \text{Rs. } 1080 \\ \% \text{ Profit} &= \frac{80}{1000} \times 100 = 8\%\end{aligned}$$

$$\begin{aligned}20. (c) \text{ The cost price of 1 toffee} \\ &= \frac{75}{125} = \text{Rs. } \frac{3}{5} \\ \text{After discount cost of 1 million toffee} \\ &= \frac{3}{5} \times 10,00,000 \times \frac{(100 - 40)}{100} \\ &= \text{Rs. } 3,60,000\end{aligned}$$

$$\begin{aligned}21. (d) \text{ According to the question.} \\ \text{CP} & \quad \text{MP} \\ (100 - 10) &: (100 + 20) \\ 90 &: 120 \\ 3 &: 4 \\ \downarrow \times 20 & \quad \downarrow \times 20 \\ 60 & \quad 80 \\ \text{Cost price of the article} &= \text{Rs. } 60\end{aligned}$$

$$\begin{aligned}22. (b) 5\% &= \frac{1}{20} \\ \text{Initial} & \quad \text{Final} \\ 20 & \quad 19 \\ 20 & \quad 19 \\ 400 & \quad 361 \\ 400 \text{ units} &= \text{Rs. } 80 \\ 1 \text{ unit} &= \frac{80}{400}\end{aligned}$$

$$361 \text{ units} = \frac{80}{400} \times 361 = \frac{361}{5}$$

= **Rs. 72.20**

$$\begin{aligned}23. (a) \text{ Marked price} &= \text{Rs. } 80 \\ \text{Selling price} &= 80 \times \frac{(100 - 10)}{100} = \text{Rs. } 72\end{aligned}$$

In Rs. 72 he buys = 12

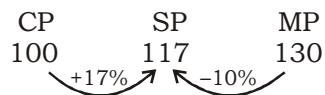
$$\text{Rs. } 1 = \frac{12}{72}$$

$$\text{₹ } 24 \text{ he buys} = \frac{12}{72} \times 24 = 4 \text{ pairs}$$

$$\begin{aligned}24. (c) \text{ printed price of a calculator} \\ &= \text{Rs. } 180 \\ \text{After first discount of 10\% price} \\ &= \frac{180 \times 90}{100} = \text{Rs. } 162 \\ \text{Another discount} &= (162 - 137.7) \\ &= \text{Rs. } 24.3 \\ \% \text{ value of another discount} \\ &= \frac{24.3}{162} \times 100 = 15\%\end{aligned}$$

$$\begin{aligned}25. (c) \\ \text{CP} &: \text{SP} \\ (100 - 12.5) &: (100 + 5) \\ 87.5 &: 105 \\ 35 &: 42 \\ & \quad \quad \quad +7 \\ \text{Required percentage} &= \frac{7}{35} \times 100 \\ &= 20\%\end{aligned}$$

$$\begin{aligned}26. (a) \text{ Let CP} &= \text{Rs. } 100 \\ \text{According to the question,}\end{aligned}$$

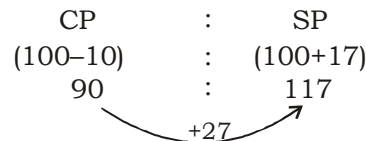


Now $SP = MP = 130$

Required % profit

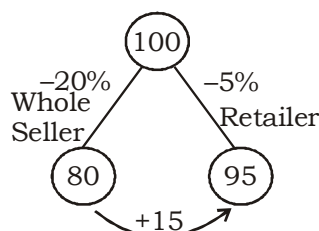
$$= \frac{(130 - 100)}{100} \times 100 = \mathbf{23.07\%}$$

Alternate →



$$\text{Required \% profit} = \frac{27}{117} \times 100 = \mathbf{23.07\%}$$

- 27. (c)** Let the marked price of the article = 100 units



According to the question,

95 units = Rs. 38

$$1 \text{ unit} = \frac{38}{95}$$

$$15 \text{ units} = \frac{38}{95} \times 15 = \mathbf{Rs. 6}$$

- 28. (a)** Total Cost of cordless phone set = Rs. 900

Material : Labour :
Overheads

$$3x : 4x : 2x$$

$$(3x + 4x + 2x) = 900$$

$$9x = 900 \Rightarrow x = 100$$

$$\text{Labour Cost} = 100 \times 4 = 400$$

$$\text{New Labour Cost} = 400 \times \frac{120}{100}$$

$$= \text{Rs. 480}$$

$$\text{New Total Cost} = (300 + 480 + 200) = \mathbf{Rs. 980}$$

- 29. (c)** Cost price of 1 article

$$= \frac{15}{5} \times \frac{100}{120} = \text{Rs. 2.5}$$

Cost price of 8 article

$$= 2.5 \times 8 = \text{Rs. 20}$$

Selling price of 8 articles = ₹ 16

$$\% \text{ loss} = \frac{(20 - 16)}{20} \times 100 = \mathbf{20\%}$$

- 30. (d)** worth of house for A

$$= \text{Rs. 10,000}$$

Cost price of house for B

$$= \frac{10,000 \times 115}{100} = \text{Rs. 11,500}$$

New cost price for A

$$= \frac{11500 \times 85}{100} = \text{Rs. 9775}$$

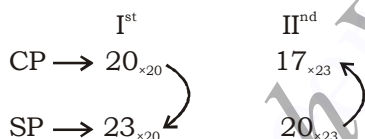
Total profit

$$= (11500 - 10000) + (10000 - 9775)$$

$$= 1500 + 225 = \text{Rs. 1725}$$

$$\% \text{ gain} = \frac{1725}{10000} \times 100 = \mathbf{17.25\%}$$

Alternate → $15\% = \frac{3}{20}$



Note → SP would be same because the selling price of A would be the cost price for B.

Total gain

$$= (400 - 391) + (460 - 400) = 69$$

Required gain%

$$= \frac{69}{400} \times 100 = \mathbf{17.25\%}$$

- 31. (b)** Cost price for B

$$= 120 \times \frac{125}{100} = \text{Rs. 150}$$

Cost price for C

$$= \frac{198}{110} \times 100 = \text{Rs. 180}$$

Note → Cost price for C would be the selling price of B.

$$\text{profit} = (180 - 150) = \text{Rs. 30}$$

$$\% \text{ profit} = \frac{30}{150} \times 100 = \mathbf{20\%}$$

- 32. (a)** Total CP = $50 \times 10 + 12 \times 40$

$$= \text{Rs. 980}$$

$$\text{Total SP} = (50 + 40) \times 11 = \text{Rs. 990}$$

$$\% \text{ profit} = \frac{(990 - 980)}{980} \times 100$$

$$= \frac{10}{98} \%$$

- 33. (c)** Let the Cost price of 1 gm is ₹1

According to the question,

$$950 \text{ SP} = 1000 \text{ CP}$$

$$\frac{\text{CP}}{\text{SP}} = \frac{950}{1000} = \frac{95}{100}$$

$$\% \text{ profit} = \frac{(100 - 95)}{95} \times 100$$

$$= \frac{100}{95} = \mathbf{5 \frac{5}{19} \%}$$

- 34. (d) Note** → Here the important point to remember is that one gross is equal to 12 dozens.

$$\text{Cost price of per egg} = \frac{36}{144}$$

$$= 25 \text{ paise}$$

Selling price per egg

$$= 25 \times \frac{9}{8} = \frac{225}{8} = 28.125 \approx 28$$

paise (apprx)

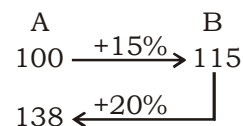
- 35. (c)** According to the question,

$$\text{Cost price for B} = \frac{75}{125} \times 100 = \text{₹}60$$

$$\text{Cost price for A} = \frac{60}{120} \times 100 = \text{₹}50$$

Note → We can also solve it from options and then we can satisfy the question condition.

- 36. (a)** Let the amount paid by A originally = 100 units



$$\text{profit} = (138 - 115) = 23 \text{ units}$$

According to the question,

$$23 \text{ units} = \text{Rs. 69}$$

$$1 \text{ unit} = \text{Rs. 3}$$

$$100 \text{ units} = \text{Rs. 3} \times 100 = \mathbf{₹300}$$

- 37. (c)** Selling price of the 1st TV

$$= \text{Rs. 3450}$$

Cost price of the 1st TV

$$= \frac{3450}{115} \times 100 = \text{Rs. 3000}$$

$$\text{Profit} = (3450 - 3000) = \text{Rs. 450}$$

According to the question,

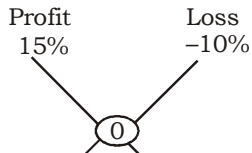
$$10\% \text{ of CP} = 450$$

$$\text{CP} = \frac{450}{10} \times 100 = \mathbf{Rs. 4500}$$

Selling price of second TV

$$= (4500 - 450) = \text{Rs. } 4050$$

Alternate → To save our valuable time we can go through in this question by Alligation rule.



$$\text{Ratio of Cost price} \rightarrow \frac{10}{2} : \frac{15}{3}$$

$$\text{Let CP of first TV} = 200$$

$$\text{Let CP of II}^{\text{nd}} \text{ TV} = 300$$

$$\text{SP of first TV} = 200 \times \frac{115}{100} = \text{Rs. } 230$$

$$\text{SP of II}^{\text{nd}} \text{ TV} = \frac{300 \times 90}{100} = \text{Rs. } 270$$

According to the question,
230 units = Rs. 3450

$$1 \text{ unit} = \frac{3450}{230}$$

$$270 \text{ units} = \frac{3450}{230} \times 270 = \text{Rs. } 4050$$

Alternate → $10\% = \frac{1}{10}$, $15\% = \frac{3}{20}$

	I st	II nd
CP →	20	10 _{×3}
SP →	23	9 _{×3}
P/L →	+3	-1 _{×3}

Note → On the whole the man gets no profit no loss.

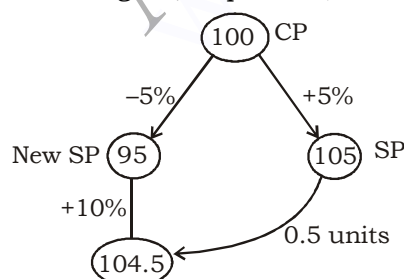
$$\text{Ratio of SP's} = 23 : 27$$

Selling price of second TV

$$= \frac{3450}{23} \times 27 = \text{Rs. } 4050$$

- 38. (d)** Let the cost price of the article = 100 units

According to the question,



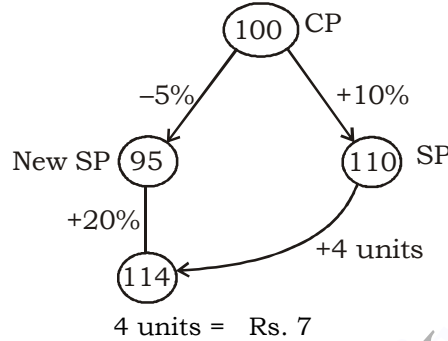
$$0.5 \text{ units} = \text{Rs. } 2$$

$$100 \text{ units} = \frac{2}{0.5} \times 100 = \text{Rs. } 400$$

$$\therefore \text{Cost price of the article} = \text{Rs. } 400$$

- 39. (a)** Let the cost price of the brief case = 100 units

According to the question,



$$4 \text{ units} = \text{Rs. } 7$$

$$1 \text{ unit} = \frac{7}{4}$$

$$100 \text{ units} = \frac{7}{4} \times 100 = \text{Rs. } 175$$

$$\text{Total cost price} = \text{Rs. } 175$$

40. (c)

	I st Cycle	II nd Cycle
CP	5	4
SP	4	5

$$\text{Loss \% on I}^{\text{st}} \text{ cycle} = \frac{1}{5} \times 100 = 20\%$$

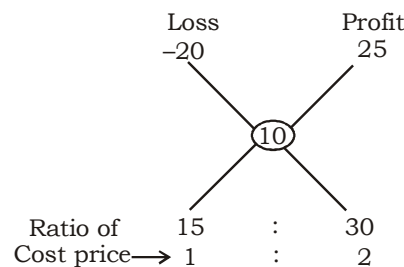
$$\text{Profit \% on II}^{\text{nd}} \text{ cycle} = \frac{1}{4} \times 100$$

$$= 25\%$$

Total profit on whole transaction

$$= \frac{90}{900} \times 100 = 10\%$$

By alligation rule,



According to the question,

$$3 \text{ units} = 900$$

$$1 \text{ unit} = 300$$

$$\text{Cost of lowered price cycle} = \text{Rs. } 300$$

- 41. (c)** Cost price of Laptops ($L_1 + L_2$) = Rs. 480

$$15\% = \frac{3}{20}, \quad 19\% = \frac{19}{100}$$

$$\text{CP} \quad 20_{\times 7} \quad 100$$

$$\text{SP} \quad 17_{\times 7} \quad 119$$

$$\text{P/L} \quad -3_{\times 7} \quad 19$$

Note → SP is same in both cases so multiply by 7 to equal the SP's of laptops.

Ratio of CP of Laptops

$$= 140 : 100$$

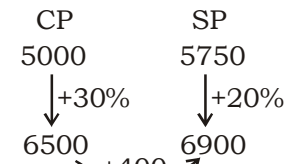
Cost of lowered price laptop

$$= \frac{100}{(140 + 100)} \times 480 = \text{Rs. } 200$$

- 42. (a)** profit % = 15%, SP = Rs. 5750

Cost price of colour TV

$$= \frac{5750}{115} \times 100 = \text{Rs. } 5000$$



$$\% \text{ profit} = \frac{400}{6500} \times 100$$

$$= \frac{400}{65} = \frac{80}{13}$$

$$\% \text{ profit} = 6\frac{2}{13}\%$$

- 43. (b)** Ratio of Cost of Manufacturing

Material	: Labour	: Over heads	Total Cost
4	: 3	: 2	
↓ ×15	↓ ×15	↓ ×15	
60	45	30	= 135

Total cost = Rs. 135

$$\% \text{ profit} = \frac{(180 - 135)}{135} \times 100$$

$$= \frac{45}{135} \times 100 = 33\frac{1}{3}\%$$

- 44. (b)** Discount offered by the Ist dealer (X)

$$= 25 + 5 - \frac{25 \times 5}{100} = 28.75\%$$

Discount offered by the IInd dealer (Y)

$$= 16 + 12 - \frac{16 \times 12}{100} = 26.08\%$$

Buying from 'X' is more preferable.

45. (c) Discount given by A

$$= 20,000 \times \frac{8}{100} + 16,000 \times \frac{5}{100}$$

$$= 1600 + 800 = \text{Rs. } 2400$$

$$\% \text{ discount} = \frac{2400}{36000} \times 100$$

$$= 6.67\%$$

46. (a) Marked price of the article
= Rs. 800

$$\% \text{ Net discount} = 5 + 5 - \frac{5 \times 5}{100}$$

$$= 9.75\%$$

$$\text{Value of Discount} = 800 \times \frac{9.75}{100}$$

$$= \text{Rs. } 78$$

Amount paid by the trader to manufacturer

$$= (800 - 78) = \text{Rs. } 722$$

Alternate $\rightarrow 5\% = \frac{1}{20}$

Initial	Final
20	19
<u>20</u>	<u>19</u>
400	361
$\downarrow \times 2$	$\downarrow \times 2$
800	<u>722</u>

Amount paid by manufacturer
= **Rs. 722**

47. (b) Cost price of the watch = ₹ 250
Cost price after custom duty

$$= 250 + \frac{250 \times 10}{100} = \text{Rs. } 275$$

CP	MP
(100 - 25)	(100 + 20)
75	120
$\downarrow \times 55$	$\downarrow \times 55$
275	<u>440</u>

Marked price = **Rs. 440**

48. (c) Cost price of the article = ₹ 400
Marked price

$$= 400 \times \frac{(100 + 80)}{100} = \text{Rs. } 720$$

After discount SP

$$= 720 \times \frac{(100 - 15)}{100} = \frac{720 \times 85}{100}$$

$$= \text{Rs. } 612$$

$$\begin{array}{ccc} \text{CP} & : & \text{SP} \\ 400 & : & 612 \\ & \text{+212} & \end{array}$$

$$\% \text{ profit} = \frac{212}{400} \times 100 = 53\%$$

Alternate:

$$\text{Let CP} = 100$$

$$\text{MP} = 180$$

$$\text{SP} = \frac{180 \times 85}{100} = 153$$

$$\text{Required \%} = \frac{153 - 100}{100} \times 100 = 53\%$$

49. (d) Let the cost price of buffalo = ₹ x

$$\text{Profit} = (720 - x)$$

$$\text{Loss} = (x - 510)$$

According to the question,

$$2(720 - x) = (x - 510)$$

$$1440 - 2x = x - 510$$

$$3x = 1950$$

$$x = 650$$

$$\text{CP of the buffalo} = \text{Rs. } 650$$

Alternate:- Note $\rightarrow$ In such type of questions follow the given method to save your valuable time.

We will divide the difference of SP's in the ratio of their profit and loss.

$$(720 - 510) = 210$$

$$\begin{array}{c} 1 : 2 \end{array}$$

$$3 \text{ units} = 210$$

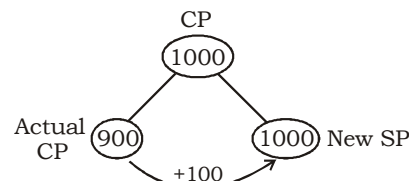
$$1 \text{ unit} = 70$$

$$\text{Cost price} = (720 - 70) = \text{Rs. } 650$$

50. (c) Selling price

$$= 60 \times \frac{115}{100} \times \frac{120}{100} = \text{Rs. } 82.8$$

51. (b) Let the Cost price of 1 gm weight Re. 1.



$$\% \text{ profit} = \frac{100}{900} \times 100 = \frac{100}{9}$$

$$= 11\frac{1}{9}\%$$

52. (c) Cost price of 750 articles

$$= 750 \times \frac{60}{100} = \text{Rs. } 450$$

Selling price per article

$$= \frac{450 \times 140}{100 \times 600} = \text{Rs. } 1.05$$

$$\text{New Selling price} = 1.05 \times 630$$

$$= \text{Rs. } 661.50$$

$$\text{Actual profit} = (661.50 - 450)$$

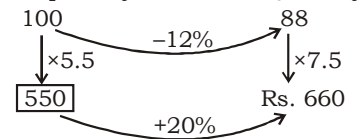
$$= 211.50$$

$$\% \text{ profit} = \frac{211.50}{450} \times 100 = 47\%$$

53. (b) Note $\rightarrow$ In such type of questions assume data according to your need which is easier in calculation,

$$\text{Let initial quantity} = 100$$

$$\text{Initial quantity} : \text{New Quantity}$$



$$\text{Initial Cost} = \frac{660}{120} \times 100 = \text{Rs. } 550$$

Initial Cost per article

$$= \frac{550}{100} = \text{Rs. } 5.50$$

54. (c) Total Cost of 900 magazines

$$= 1000 + \frac{120}{100} \times 900 + \frac{60}{100} \times 900$$

$$= 1000 + 1080 + 540 = \text{Rs. } 2620$$

After profit Total Cost

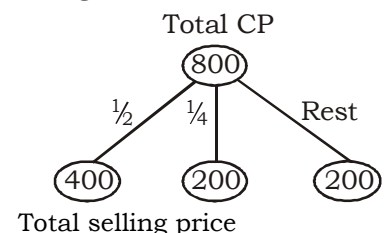
$$= 2620 + \frac{2620 \times 10}{100} = \text{Rs. } 2882$$

$$\text{Selling price of 784 copies} = 784 \times 2.75 = \text{Rs. } 2156$$

$$\text{Required amount from advertisement} = 2882 - 2156$$

$$= \text{Rs. } 726$$

55. (b) Let the quantity of goods be 800 units and the cost price of 1 unit goods be Re. 1.



Total selling price

$$= 400 \times \frac{130}{100} + 200 \times \frac{130}{100} \times \frac{85}{100} + 200 \times \frac{130}{100} \times \frac{70}{100}$$

$$= 520 + 221 + 182 = \text{Rs. } 923$$

$$\% \text{ profit} = \frac{(923 - 800)}{800} \times 100$$

$$= \frac{123}{8} = 15.375\%$$

56. (b) Cost price of the article = ₹x
Marked price of the article = ₹(x + 205)

CP	SP	MP
x	$\frac{9}{10}(x + 205)$	(x + 205)

↖ -10% ↗

$$\text{Profit} = \frac{9}{10}(x + 205) - x$$

% profit

$$= \left(\frac{9x + 1845 - 10x}{10} \right) \times 100$$

$$\% \text{ profit} = \frac{(1845 - x)}{10x} \times 100$$

$$\% \text{ profit} = \frac{(1845 - x)}{x} \times 10$$

$$\% \text{ profit} = \frac{[(18450)] - 10x}{x}$$

57. (a) (i) 30% discounts

(ii) $15 + 15 - \frac{15 \times 15}{100} = 27.75\%$

(iii) $20 + 10 - \frac{20 \times 10}{100} = 28\%$

(iv) $20 + 12 - \frac{20 \times 12}{100} = 29.60\%$

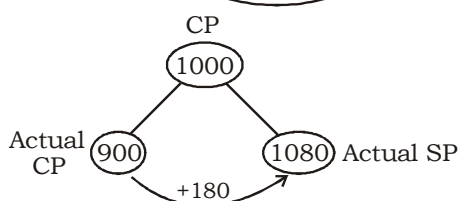
So we can say option (a) is better for customer.

58. (c) Let the initial price = 1000 and the price of 1 gm weight is Re. 1.

According to the question,

CP	SP	MP
1000	1080	1200

↖ -10% ↗
↖ +20% ↗



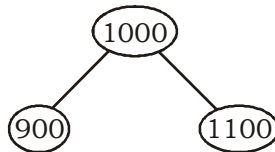
$$\% \text{ profit} = \frac{180}{900} \times 100 = 20\%$$

59. (c) Let CP of the article = 100 and the cost price of 1 gm be Re. 1.

CP	SP	MP
100	108	120

↖ -10% ↗
↖ +20% ↗

According to the question,



Note → (1) He buys 1100 gm instead of 1000 gms (due to his cheating) and sells only 900 gms when he takes the money for 1 kg.

(2) To calculate profit percentage, we either equate the goods or the money.

	CP	SP
I st Case	→ 100 _{x11}	108 _{x11}
II nd Case	→ 1100	900

% profit

$$= \frac{(108 \times 11 - 900)}{900} \times 100$$

$$= \frac{288}{900} \times 100$$

$$\% \text{ profit} = 32\%$$

Alternative:

Cost paid by shopkeeper	Actual Cost	Cost paid by customer
1000 ₉₀	1100 ₉₀	900 ₁₁
9000	9900	9900

↖ +2880 ↗

$$\text{Required profit \%} = \frac{2880}{9000} \times 100$$

$$= 32\%$$

60. (d) **Note** → He takes 10% extra discount.

CP	SP
9000	11880

↖ -10% ↗
↖ +3780 ↗

% Required profit

$$= \frac{3780}{8100} \times 100$$

$$= 46.66\%$$

61. (a)
- | | | |
|-----------------------|-------------------|-----------------|
| | Quantity | Rate |
| I st Type | → 4 _{x5} | 1 _{x5} |
| II nd Type | → 5 _{x4} | 1 _{x4} |
- quantity both types of apples are equal.

	Rate	Quantity
	(5+4)	(20+20)
CP	→ 9 _{x9}	40 _{x9}
SP	→ 2 _{x40}	9 _{x40}

Note → In such type of questions equate the quantity for easier calculation,

$$\text{Total CP} = 81, \text{ SP} = 80$$

$$\text{Loss} = 81 - 80 = \text{Re. } 1.$$

$$\% \text{ Loss} = \frac{1}{81} \times 100 = 1.23\%$$

Alternative:

$$\text{Total C.P.} = \frac{1}{4} \times 180 + \frac{1}{5} \times 180$$

$$= 45 + 36 = 81$$

$$\text{Total S.P.} = \frac{2}{9} \times 360 = 80$$

$$\text{Loss \%} = \frac{1}{81} \times 100 = 1.23\%$$

62. (d) Net sale price after two successive discounts of 10% and 5%.

Net sale price

$$= 600 \times \frac{(100 - 10)}{100} \times \frac{(100 - 5)}{100}$$

$$= 600 \times \frac{90}{100} \times \frac{95}{100} = \text{Rs. } 513$$

Net price with sales tax

$$= 513 + \frac{513 \times 5}{100} = \text{₹ } 538.65$$

63. (b) Cost price of 1 kg rice = $\frac{1100}{100}$ = Rs. 11/kg

Note → The loss is covered by the sale of 20 extra kgs of rice.

i.e. CP of 100 kg rice = SP of 120 kg rice

$$\frac{\text{CP}}{\text{SP}} = \frac{120}{100} = \frac{6}{5}$$

According to the question,

$$6 \text{ units} = 11 \text{ Rs./kg}$$

$$1 \text{ unit} = \frac{11}{6} \text{ Rs./kg}$$

$$5 \text{ units} = \frac{11}{6} \times 5 = \frac{55}{6}$$

$$= 9.166 \text{ Rs./kg}$$

SP of the rice

= **Rs. 9.166 per kg.**

- 64. (c)** Let initially customer bought 100 kg fruits and the rate per kg is Re. 1. According to the question,

Quantity	×	Price	=	Revenue
100	×	100	=	10,000
↓ -20%		↓		
80	×	126.5	=	10120

Note → Increased price

$$= 115 + \frac{115 \times 10}{100} = 126.5$$

new profit %

$$= \frac{120}{10,000} \times 100 = 1.2\%$$

$$\text{Required \% decrease} = (15 - 1.2) = 13.8\%$$

65. (a) $25\% = \frac{1}{4}$,

CP	SP
Ist salesman	$4_{\times 4}$
$5_{\times 4}$	
IInd salesman	$5_{\times 5}$
$4_{\times 5}$	

Note → SP is same in both cases.

CP	SP
16	20
25	20

$$41 \quad 40$$

$$\text{Difference in profits} = (5 - 4) = 1 \text{ unit}$$

$$1 \text{ unit} = \text{Rs. } 100$$

$$\text{Selling price} = 20 \times 100 = \text{Rs. } 2000$$

66. (b) $20\% = \frac{1}{5}$

	Salesman A		Salesman B
CP →	$5_{\times 5}$	:	$4_{\times 6}$
SP →	$6_{\times 5}$	:	$5_{\times 6}$
Profit →	$+1_{\times 5}$	:	$+1_{\times 6}$
	5	:	6
	1 unit		

Note → SP is same in both cases.

According to the question,

$$30 \text{ units} = \text{Rs. } 3000$$

$$1 \text{ unit} = \text{Rs. } \frac{3000}{30} = \text{Rs. } 100$$

$$\text{Difference} = 1 \times 100 = \text{Rs. } 100$$

- 67. (b)** Total Sales revenue

$$= (3000 - 1000) \times 3.25 \times \frac{(100 - 25)}{100}$$

$$= 2000 \times \frac{325}{100} \times \frac{75}{100} = \text{Rs. } 4875$$

Total Profit (old)

$$= 4875 - 4800 = \text{Rs. } 75$$

New total revenue

$$= 3000 \times \frac{425}{100} \times \frac{75}{100} = \text{Rs. } 9562.5$$

Total profit (New)

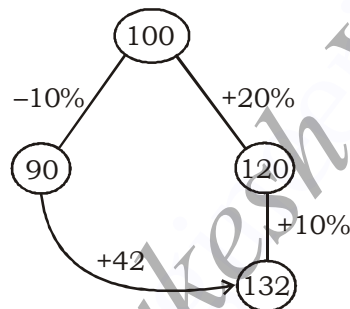
$$= 9562.5 - 4800 = \text{Rs. } 4762.5$$

$$\text{Ratio of profit} = \frac{\text{New}}{\text{Old}} = \frac{4762.5}{75}$$

$$= 63.5$$

- 68. (c)** Let the cost price of the article = Rs. 100

According to the question,



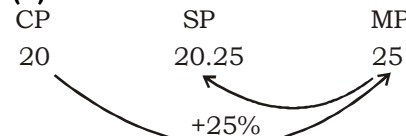
$$\text{Original Profit} = \frac{20}{100} \times 100 = 20\%$$

$$\text{New profit} = \frac{42}{90} \times 100 = 46.66\%$$

Change in profit %

$$= \frac{(46.66 - 20)}{20} \times 100 = \text{133.33\%}$$

- 69. (d)**



% Combined discount

$$= \frac{(25 - 20.25)}{25} \times 100$$

$$= \frac{4.75}{25} \times 100 = \text{19\%}$$

Note → Now we can assume two same values that give combined result of 19%.

$$\% \text{ discount value} = 10\%$$

% old profit

$$= \frac{(20.25 - 20)}{20} \times 100 = 1.25\%$$

According to the question,
When values increase,
Net increment

$$= 10 + 10 + \frac{10 \times 10}{100} = 21\%$$

$$\text{New SP} = 25 \times \frac{121}{100} = 30.25$$

% New profit

$$= \frac{(30.25) - 20}{20} \times 100$$

$$= \frac{10.25 \times 100}{20} = 51.25\%$$

% Change in profit

$$= \frac{(51.25 - 1.25)}{1.25} \times 100 = \text{4000\%}$$

- 70. (b)** Total sales = Rs. 12,600

$$\text{Primary Cost} = 12600 \times \frac{35}{100}$$

$$= \text{₹ } 4410$$

$$\text{Gross profit} = 12600 -$$

$$\left[4410 + 1400 + 650 + \frac{12600 \times 2}{100} \right]$$

$$= 12600 - [4410 + 1400 + 650 + 252] = \text{Rs. } 5888$$

$$\text{Trading Cost} = 5888 \times \frac{25}{100} = \text{₹ } 1472$$

$$\text{Net profit} = 5888 - 1472 = \text{₹ } 4416$$

$$\% \text{ profit} = \frac{4416}{14000} \times 100 = \frac{4416}{140} = 31.54\%$$

- 71. (a)** Let the price of cycles be C_1 and C_2 respectively.

According to the question,

Condition (I):

$$96 + C_1 = 2C_2$$

$$C_1 = 2C_2 - 96 \dots (i)$$

Condition (II):

$$96 + C_2 = C_1 - 306$$

Putting the value of C_1 from equation (i)

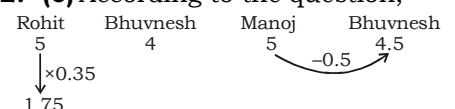
$$96 + C_2 = 2C_2 - 96 - 306$$

$$C_2 = 96 + 96 + 306 = 498$$

$$C_1 = 2 \times 498 - 96 = \text{Rs. } 900$$

$$\therefore \text{price of first cycle}(C_1) = \text{₹ } 900$$

- 72. (c)** According to the question,



$$\therefore \text{Hence Required loss} = 0.5 \times 0.35 = 0.175 \text{ Lakh} = \text{Rs. } 17500$$

73.(a) Let the Cost price of the book

be $5x$ and it was sold for $5x \times \frac{4}{5}$

= $4x$ rupees.

Now the book is sold for $4x + 12$ rupees.

According to question,

$$\frac{4x + 12}{5x} = \frac{13}{10}$$

$$40x + 120 = 65x$$

$$25x = 120$$

$$x = \frac{120}{25}$$

Cost price of the book = $5x = 24$

So initial selling price of the book

$$4x = 19.2$$

New selling price = $19.2 + 4.8 = 24$

Hence the selling price = Cost price

so there will be no profit no loss.

74. (b) Let the total population be 100

Then according to question,

Total investment = $100 \times 50 = 5000$

Condition : (I)

Profit earned

$$= 55 \times 50 \times \frac{5}{100} + 45 \times 50 \times$$

$$\frac{8}{100} = 137.5 + 180 = 317.5$$

Profit percentage

$$= \frac{317.5}{5000} \times 100 = 6.35\%$$

Condition :- (II)

$$\text{Profit earned} = 45 \times 50 \times \frac{5}{100} +$$

$$55 \times 50 \times \frac{8}{100}$$

$$= 112.5 + 220 = 332.5$$

Profit percentage

$$= \frac{332.5}{5000} \times 100 = 6.65\%$$

Change in percentage profit

$$= 6.65 - 6.35$$

$$= \mathbf{0.30\% \text{ (increase)}}$$

75. (c) Now from the last question,

New profit earned

$$= \frac{11}{10} \times 55 \times 50 \times \frac{5}{100} + \frac{11}{10} \times 45 \times 50 \times \frac{80}{100}$$

$$= \frac{11}{10} \times (317.5) \text{ and}$$

New investment

$$= \frac{11}{10} \times 100 \times 50$$

[$\therefore$ Population increased by 10%]

New profit percentage

$$= \frac{\frac{11}{10} \times 317.5}{\frac{11}{10} \times 100 \times 50} \times 100 = 6.35\%$$

Hence no change in profit percentage.

76. (a) Initial profit earned = 317.50

New profit earned

$$= \frac{11}{10} \times 317.50 = 349.25$$

Percentage Increase in Profit

$$= \frac{349.25 - 317.50}{317.50} \times 100$$

$$= \frac{31.75}{317.50} \times 100 = \mathbf{10\% \text{ (Increase)}}$$

77. (b) Now new profit earned

$$= 45 \times 50 \times \frac{6}{100} + 55 \times 50 \times \frac{9}{100}$$

$$= 135 + 247.5 \Rightarrow 382.5$$

New Profit percentage

$$= \frac{382.5}{5000} \times 100 = 7.65\%$$

Hence change in profit percentage

$$= 7.65 - 6.35$$

$$= \mathbf{1.3\% \text{ (increase)}}$$

78. (b) Let price of the four seater

rickshaw = $4x$

Then the price of two-seater rick-

$$\text{shaw} = \frac{3}{4} \times 4x = 3x$$

According to the question,

$$8 \times 4x + 22 \times 3x = \frac{7}{5} \times 4725$$

$$32x + 66x = 6615$$

$$98x = 6615$$

$$x = 67.5$$

Hence the selling price of four seater rickshaw

$$= 4x = 4 \times 67.5 \Rightarrow \mathbf{Rs. 270}$$

79.(d) The price of Raghav's flat af-

ter two year

$$= \frac{6}{5} \times \frac{6}{5} \times 2 \Rightarrow 2.88 \text{ lakh}$$

$$\Rightarrow 2,88,000$$

The price of Sita's land after two year

$$= \frac{11}{10} \times \frac{11}{10} \times 2.2 \Rightarrow 2.662 \text{ lakh}$$

$$\Rightarrow 2,66,200$$

% Gain of Sita

$$= \frac{288000 - 266200}{266200} \times 100$$

$$= \frac{21800}{266200} \times 100 = \mathbf{8.18\%}$$

80. (d) Note $\rightarrow$ Since the expected return percentage of C is not given that is why we cannot allocate money to C properly. Hence the question can not be solved with the given information.

81. (c) It is obvious from the question that the number of ovens

$$= 12 + 3 = 15$$

and the number of washing machines = $25 - 15 = 10$.

Let the price of washing machine

be x and oven be y .

They by question,

$$\frac{20}{100} \times (8x) + 12 \times 20,000 - 40,000$$

$$x = 10,000$$

Total cost of 10 washing machines = $10 \times$

$$10,000 = 1,00,000$$

Total cost of 15 ovens = $2,05,000 - 1,00,000$

$$= 1,05,000$$

cost of 1 oven = $7,000$

Total selling price of 8 washing machines and 12 ovens.

$$= 8 \times \frac{6}{5} \times 10,000 + 12 \times 9000$$

$$= 96000 + 108000 = 2,04,000$$

Loss of Raghav

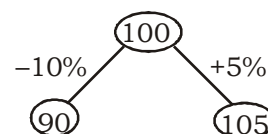
$$= 2,05,000 - 2,04,000$$

$$= \mathbf{Rs. 1000}$$

82. (c) Let the cost price of the watch

= Rs.100

According to the question,

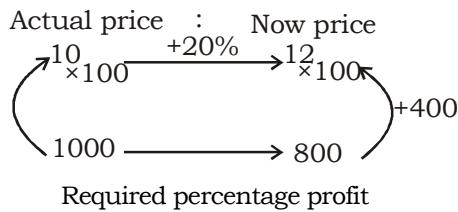


Loss = Rs. 10

Profit = Rs. 5

Required percentage

$$= \frac{10}{5} \times 100 = \mathbf{200\%}$$

83. (a) Let the price of 1 gm is Rs. 1**84. (a)** Cost of the article for D = 2145
Cost of article for C

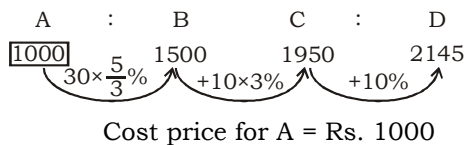
$$= \frac{2145}{110} \times 100 = 1950$$

According to the question,
B's profit = $10 \times 3 = 30\%$

$$\text{Cost for B} = \frac{1950}{130} \times 100 = \text{Rs. } 1500$$

$$\text{A's profit} = \frac{5}{3} \times 30 = 50\%$$

$$\text{Cost for A} = \frac{1500}{150} \times 100 = \text{Rs. } 1000$$

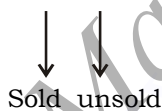
Alternatively:**85. (a) Note:** For maximum profit he will buy the goods at less price and sold it at maximum price.

$$\therefore \text{CP} = 500, \text{SP} = 888$$

$$\text{maximum profit} = (888 - 500) = \text{Rs. } 388$$

86. (a) Monitor + printer = 25

$$\text{Total printer} = (2 + 3) = 5$$



$$\text{Total profit from printers sale} = 2 \times 2000 = \text{Rs. } 4000$$

$$\text{Then profit from monitor sales} = (49000 - 4000) \text{ Rs.} = 45000$$

$$\text{monitor sold by Rakesh Yadav} = 20 \times \frac{75}{100} = 15$$

$$\text{profit on selling per monitor} = \frac{45000}{15} = \text{Rs. } 3000$$

87. (d) By charging Rs. 1.2 more his profit should double to 40%. This means that his profit of 40% should be equal to Rs. 2.4
 $\therefore 40\% \text{ of CP} = 2.4$

$$1\% \text{ of CP} = \frac{2.4}{40}$$

$$100\% \text{ CP} = \frac{2.4}{40} \times 100 = \text{Rs. } 6$$

$$\therefore \text{selling price} = (6 + 1.2) = \text{Rs. } 7.2$$

88. (a) $25\% = \frac{1}{4} \rightarrow \text{Profit}$
 $\frac{1}{4} \rightarrow \text{CP}$

$$\text{old} \rightarrow \begin{matrix} \text{CP} & \text{SP} \\ 4x & : & 5x \end{matrix}$$

$$\text{According to question,} \begin{matrix} \text{CP} & : & \text{SP} \end{matrix}$$

$$\text{New} \rightarrow (4x - 950) : (5x - 950)$$

$$\frac{(4x - 950)}{(5x - 950)} = \frac{10}{13} \left[\because 30\% = \frac{3}{10} \right]$$

$$52x - 950 \times 13 = 50x - 950 \times 10$$

$$2x = 950 (13 - 10)$$

$$x = 475 \times 3 = 1425$$

$$\text{cost price} = 4x = 4 \times 1425 = \text{Rs. } 5700$$

Alternatively:**Note:** 1 In such type of questions to save your valuable time please follow the below given formula.

$$\text{CP} = \frac{\text{intital profit} + \text{more profit}}{\text{more profit}} \times \text{same}$$

2. use this formula when the value of decreament/increament is same

$$\text{CP} = \frac{(25 + 5)}{5} \times 950 = 6 \times 950$$

$$= \text{CP} = \text{Rs. } 5700$$

89. (a) $30\% = \frac{3}{10} \rightarrow \text{Profit}$
 $\frac{3}{10} \rightarrow \text{CP}$

$$\text{old} \rightarrow \begin{matrix} \text{CP} & \text{SP} \\ 10x & : & 13x \end{matrix}$$

$$\text{According to question,}$$

$$\begin{matrix} \text{CP} & : & \text{SP} \end{matrix}$$

$$\text{New} \rightarrow (10x - 600) : (13x - 600)$$

$$\frac{(10x - 600)}{(13x - 600)} = \frac{5}{7}$$

$$\left[40\% = \frac{2}{5} \rightarrow \text{Profit} \right]$$

$$70x - 4200 = 65x - 3000$$

$$5x = 1200$$

$$x = 240$$

$$\text{cost price} = 10x = 10 \times 240 = \text{Rs. } 2400$$

Alternatively:

$$\text{CP} = \frac{(30 + 10)}{10} \times 600$$

$$\text{CP} = \text{Rs. } 2400$$

90. (a) Note: In such type of questions make quantity of articles equal to make calculation easier.

$$\begin{matrix} \text{Quantity} & \text{Rate} \\ \text{CP}_2 \rightarrow 5 \times_4 & 1 \times_4 \\ \text{CP}_2 \rightarrow 4 \times_5 & 1 \times_5 \end{matrix}$$

Note : he buys same number of articles.

$$\begin{matrix} \text{Quantity} & \text{Rate} \\ \text{CP} \rightarrow 40 \times_9 & : & 9 \times_9 \\ \text{SP} \rightarrow 9 \times_{40} & : & 2 \times_{40} \end{matrix} \quad \begin{matrix} \\ \\ -1 \text{ unit} \end{matrix}$$

Loss = 1 unit

According to the question,
1 unit = Rs. 30

$$\text{Total articles bought by him} = 30 \times 360 = \text{10800}$$

91. (a)

$$\begin{matrix} \text{Quantity} & \text{Rate} \\ \text{CP}_1 \rightarrow 2 \times_3 & : & 1 \times_3 \end{matrix}$$

$$\text{CP}_2 \rightarrow 3 \times_4 : 1 \times_4$$

Note: He buys the articles double at 3 for Rs. 1.

$$\begin{matrix} \text{Quantity} & \text{Rate} \\ \text{CP} \rightarrow 18 \times_2 & : & 7 \times_2 \\ \text{SP} \rightarrow 4 \times_9 & : & 1 \times_9 \end{matrix} \quad \begin{matrix} \\ \\ -5 \text{ unit} \end{matrix}$$

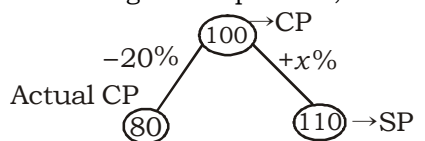
$$5 \text{ units} = 45$$

$$1 \text{ unit} = 9$$

$$\text{Number of articles bought} = 9 \times 36 = \text{324}$$

92. (a) Let the initial weight = 100 gm and the cost price of 1gm weight is Re.1

According to the question,

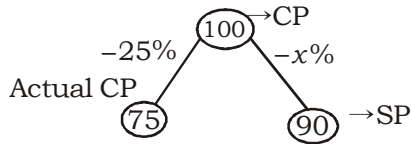


$$\text{gain \%} = 37 \frac{1}{2}\% = \frac{3}{8} \rightarrow \text{Profit}$$

$$\text{CP} = 8 \text{ units} \quad \text{SP} = 11 \text{ units}$$

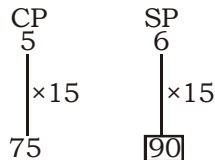
$$\begin{matrix} \downarrow \times 10 & \downarrow \times 10 \\ 80 & 110 \\ x\% = \frac{(110 - 80)}{80} \times 100 = 37.5\% \end{matrix}$$

93. (a) Let Initial weight = 100 gm and the cost price of 1 gm weight is be Re. 1 According to the question,



$$\text{gain \%} = 20\% = \frac{1}{5} \rightarrow \text{Profit}$$

$$\frac{1}{5} \rightarrow \text{CP}$$



$$x\% = \frac{(100 - 90)}{100} \times 100 = 10\%$$

94. (a) **Note:** In such type of questions follow the below given method to save your valuable time.

CP	MP
(100 - Discount): (100 - 4)	(100 + profit) (100 + 35)
Total number of article ← 16	135
Ratio of cost of 1 article ← 2	9

$$\text{ratio of CP : MP} = 2 : 3$$

95. (a)

CP	MP
(100 - 20): (100 + 20)	
Total number of articles ← 16	120
Ratio of cost of 1 article ← 1	10

96. (a) Let the cost price of 1 book and 1 pen is B and P respectively.

$$\begin{aligned} 8B + 5P &= 92 \dots\dots\dots (i) \\ 5B + 8P &= 77 \dots\dots\dots (ii) \end{aligned}$$

Note: To solve such type of equations easily.

First add both equations and for second equation take difference of both equations.

$$\begin{aligned} \text{On adding } 13B + 13P &= 169 \\ B + P &= 13 \dots\dots\dots (iii) \\ \text{on subtraction, } 3B - 3P &= 15 \end{aligned}$$

$$\begin{aligned} B - P &= 5 \dots\dots\dots (iv) \\ \text{from equations (iii) and (iv)} \end{aligned}$$

$$B = \frac{13 + 5}{2} = 9, P = \frac{13 - 5}{2} = 4$$

$$\text{Total CP} = 3B + 2P = 3 \times 9 + 2 \times 4 = \text{Rs. 35}$$

97. (a) Let the initial cost price of Book and pen is B and P respectively.

$$\begin{aligned} 13\% B + 17\% P &= \text{profit} \\ 17\% B + 13\% P &= (\text{profit} + 80) \end{aligned}$$

$$\begin{aligned} \text{on subtraction,} \\ -4\% B + 4\% P &= -80 \\ 4\% B - 4\% P &= 80 \\ 4\% [B - P] &= 80 \end{aligned}$$

$$\frac{4}{100} [B - P] = 80$$

$$\begin{aligned} B - P &= 2000 \dots\dots (i) \\ B + P &= 25000 \text{ [given]} \dots\dots (ii) \end{aligned}$$

$$(i) B = \frac{25000 + 2000}{2} = \text{Rs. 13500}$$

$$P = \frac{25000 - 2000}{2} = \text{Rs. 11500}$$

$$(ii) \text{ Difference in cost price} = \text{Rs. 2000}$$

98. (a) Let the cost price of a table and a book is

$$\begin{aligned} \text{Rs. T and B respectively.} \\ \text{According to the question,} \end{aligned}$$

$$\begin{aligned} -12\% T + 19\% B &= 160 \\ 12\% T - 16\% B &= -40 \end{aligned}$$

$$\text{on adding, } 3\% B = 120$$

$$B = \frac{120}{3} \times 100 = 4000$$

$$\text{cost of Book} = \text{Rs. 4000}$$

Note: The value of loss should be written with negative sign.

99. (a) Let the price of a table and chair is Rs. T and C.

$$\text{According to the question,}$$

$$\begin{aligned} 15\% T - 12\% C &= 540 \dots\dots\dots (i) \\ -12\% + 15\% C &= 0 \dots\dots\dots (ii) \end{aligned}$$

$$\text{on adding equation (i) and (ii)}$$

$$3\% T + 3\% C = 540$$

$$T + C = 18000 \dots\dots\dots (iii)$$

$$\text{on subtraction [equation (i) - equation (ii)]}$$

$$27\% T - 27\% C = 540$$

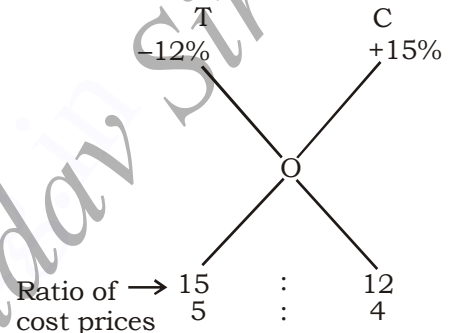
$$T - C = 2000 \dots\dots\dots (iv)$$

from equation (iii) and (iv)

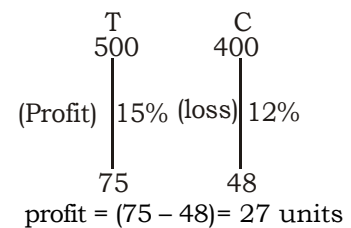
$$\begin{aligned} \text{cost of table} &= \frac{18000 + 2000}{2} \\ &= \text{Rs. 10,000} \end{aligned}$$

$$\begin{aligned} \text{Cost of chair} &= \frac{18000 - 2000}{2} \\ &= \text{Rs. 8000} \end{aligned}$$

Alternate: By Alligation rule,



$$\text{Let price of Table} = 500 \text{ and chair} = 400$$



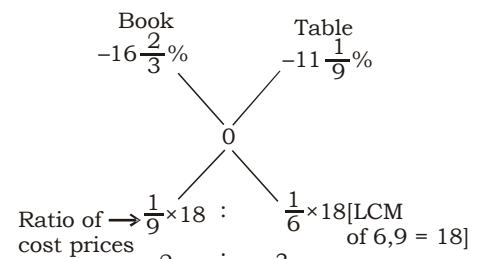
$$27 \text{ units} = 540$$

$$1 \text{ unit} = 20$$

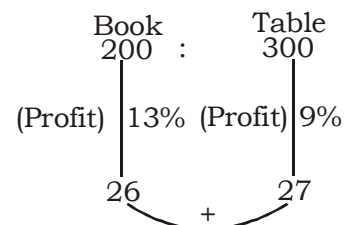
$$\begin{aligned} \text{cost price of Table} &= 20 \times 500 \\ &= \text{Rs. 10,000} \end{aligned}$$

$$\begin{aligned} \text{cost price of Chair} &= 400 \times 20 \\ &= \text{Rs. 8000} \end{aligned}$$

100. (a)



$$\text{Let the price of table} = 200 \text{ and chair} = 300$$



∴ According to the question,

$$53 \text{ units} = \text{Rs. } \frac{1060}{53} = \text{Rs. } 20$$

$$\therefore \text{Cost price of Book} = 20 \times 200 = \text{Rs. } 4000$$

$$\therefore \text{Cost price of table} = 20 \times 300 = \text{Rs. } 6000$$

101.(a) $10\% = \frac{1}{10}, 25\% = \frac{1}{4}$

$$SP_1 + SP_2 = 1710 \text{ [Given]}$$

	I st	:	II nd
CP	10	:	4 _{x2}
SP	9	:	5 _{x2}

P/L	-1	:	+1 _{x2}
-----	----	---	------------------

Note: $CP_1 = SP_2$ [Given] So multiply all the values by 2 in IInd part.

$$\text{Total SP} = (9 + 10) = 19 \text{ units}$$

According to the question,

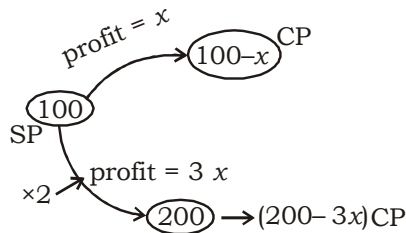
$$19 \text{ units} = 1710$$

$$1 \text{ unit} = \frac{1710}{19} = \text{Rs. } 90$$

$$\text{Total profit} = (2 - 1) \times 90 = \text{Rs. } 90$$

102.(a) Let the SP = Rs. 100, and profit = Rs. x

Now, According to the question,



CP will be equal in both cases:

$$200 - 3x = 100 - x$$

$$2x = 100$$

$$x = 50$$

$$CP = (100 - x) = 100 - 50 = 50$$

$$\% \text{ profit} = \frac{50}{50} \times 100 = 100\%$$

103.(b) profit = 10% = $\frac{1}{10} \rightarrow$ profit

$$\therefore \text{C.P.} \quad \therefore \text{S.P.}$$

10	:	11
↓ ×40.5		↓ ×40.5

$$405 \quad 445.5$$

i.e. selling price = Rs. 445.5

& Remaining apples = 10 - 1 = 9 kg

∴ selling price of remaining apples per kg

$$= \frac{445.5}{9} = \text{Rs. } 49.50$$

104.(c) Cost price of house for Y = 105 % of 150000
= Rs. 157500
S.P. of house for Y = 98 % of 157500
= Rs. 154350
∴ Gain for X = Rs. (157500 - 154350)
= Rs. 3150

105.(a) CP of a book = $\frac{12000}{200}$
= Rs. 60

$$\therefore \text{Total profit} = \text{Rs. } 60 \times 20 = \text{Rs. } 1200$$

∴ profit %

$$= \frac{1200}{12000} \times 100 = 10\%$$

106.(a) C.P. of first buyer = Rs. (840 + 10 % of 840)
= Rs. 924

Now, this item is sold to the second buyer at 5 % loss.

$$\therefore \text{Final selling price} = \text{Rs. } (924 - 5\% \text{ of } 924)$$

$$= \text{Rs. } (924 - 46.20)$$

$$= \text{Rs. } 877.80$$

Alternate:

10%	=	$\frac{1}{10}$	5%	=	$\frac{1}{20}$
Initial		Final			
10		11			
20		19			
200		209			
↓ ×4.2		↓ ×4.2			
840		877.8			

107.(d) C.P. of 100 oranges = Rs. 350

$$\text{S.P. of 12 oranges} = \text{Rs. } 48$$

$$\therefore \text{S.P. of 100 oranges}$$

$$= \text{Rs. } \frac{48}{12} \times 100 = \text{Rs. } 400$$

$$\therefore \text{profit \%} = \frac{400 - 350}{350} \times 100$$

$$= \frac{50}{350} \times 100 = \frac{100}{7} = 14\frac{2}{7}\%$$

108.(d) By Alligation Rule

Ist investment 2nd investment

+15%		-10%
↙	x	↘
x+10		15-x
3	:	5

$$\therefore \frac{x+10}{15-x} = \frac{3}{5}$$

$$\Rightarrow 5x + 50 = 45 - 3x$$

$$\Rightarrow 8x = -5$$

$$\Rightarrow x = -\frac{5}{8}$$

$$\text{i.e. loss \%} = x\% = \frac{5}{8}\%$$

Alternate:

Ist	:	Iind
300		500
↓ 15% (profit)		↓ 10% (loss)
45		-50
Total loss = (-50 + 45) = -5		

$$\text{Required \%} = \frac{-5}{800} \times 100 = \frac{-5}{8}\%$$

109.(d) Note: for detailed solution check earlier question of same type.

$$\text{Given, S.P.} = \text{Rs. } 39$$

Now go through the options

option (a).

$$\text{C.P.} = 20$$

$$\therefore \text{S.P.} = 20 + 20\% \text{ of } 20 = 24 \neq 39$$

option (d).

$$\text{C.P.} = 30$$

$$\therefore \text{s.p.} = 30 + 30\% \text{ of } 30 = 39 = \text{Given S.P.}$$

i.e. option (d) is the required answer.

[Note : option (b) & (c) give s.p. ≠ Integer]

110.(b) Given S.P - C.P = 210

$$\text{profit} = 25\% = \frac{1}{4} \rightarrow \text{profit}$$

$$\Rightarrow \text{S.P.} = 4 + 1 = 5$$

$$\therefore \text{S.P.} - \text{C.P} = 5 - 4 = 1$$

$$\text{i.e. } 1 \text{ unit} = \text{Rs. } 210$$

$$5 \text{ units} = 5 \times 210 = \text{Rs. } 1050$$

111.(c) C.P. of 73 articles = Rs. 5110

$$\therefore \text{C.P. of 89 articles}$$

$$= \frac{5110}{73} \times 89 = \text{Rs. } 6230$$

$$\& \text{ total S.P. of 89 articles} = \text{Rs. } 5607$$

$$\therefore \text{loss \%} = \frac{6230 - 5607}{6230} \times 100$$

$$= \frac{623}{6230} \times 100 = 10\%$$

112.(d) let S.P. = 100
 $\therefore$ C.P. = 95
 $\therefore$ profit %

$$= \frac{100 - 95}{95} \times 100 = \frac{5}{95} \times 100$$

$$= 5.26\%$$

113.(c) By Alligation Rule,

Fan-I + 15 %	Fan-II - 9 %
0	
0 - (-9) = 9	15 - 0 = 15

i.e. C.P. of I-fan : C.P. of II- Fan
 $= 9 : 15 = 3 : 5$
 Cost price of first fan

$$= \frac{2160}{8} \times 3 = \text{Rs. } 810$$

 Cost price of IInd fan

$$= \frac{2160}{8} \times 5 = \text{Rs. } 1350$$

114.(d) C.P of 7 oranges = Rs. 3
 C.P of 1 orange = $\frac{3}{7}$
 S.P of 1 orange = $\frac{3}{7} \times \frac{(100 + 33)}{100}$
 S.P of 100 orange

$$= \frac{3}{7} \times \frac{133}{100} \times 100 = \text{Rs. } 57$$

115.(c) let the C.P. of the commodity = Rs. x
 According to the question,
 $524 - x = x - 452$
 or $2x = 524 + 452$
 or $2x = 976$
 or $x = \frac{976}{2} = 488$

i.e. required C.P. = Rs. 488
Note: for alternate method check earlier questions of same type.

116.(d) By Alligation Rule,

7 %	17 %
10 %	
7	3

$\therefore$ part sell at 7 % profit

$$= \frac{7}{7 + 3} \times 100 = 70\text{kg}$$

117.(a) Let C.P. of each goat = Rs. 100

CP ₁ (100)	(100) CP ₂
1st goat	2nd goat
↓ - 20 %	↓ + 44 %
S.P ₁ (80)	(144) S.P ₂

But, given that S.P. of both goats is same. To make equal, multiply SP₁ by 9 and SP₂ by 5
 $\therefore$ CP₁ = 100 $\times$ 9 = 900
 & CP₂ = 100 $\times$ 5 = 500
 $\Rightarrow$ CP₁ : CP₂ = 9 : 5

$$\therefore \text{CP}_1 = \frac{9}{14} \times 1008 = \text{Rs. } 648$$

118.(b) Given, Loss % (when S.P. = 50) : Profit % (when S.P. = 70) = 1 : 1

50	70
↓	
20	
1	1
↓	
10	10

$\therefore$ C.P. of the article = 50 + 10 or 70 - 10 = Rs. 60

$\therefore$ Required %

$$= \frac{10}{60} \times 100 = 16\frac{2}{3}\%$$

119.(a) By Alligation Rule,

1st watch +16 %	2nd watch -12 %
0%	
0 + 12 = 12	16 - 0 = 16

i.e.

$$\frac{\text{C.P. of 1}^{\text{st}} \text{ watch}}{\text{C.P. of 2}^{\text{nd}} \text{ watch}} = \frac{12}{16} = \frac{3}{4}$$

$$\therefore \text{C.P. of 1}^{\text{st}} \text{ watch} = \frac{3}{7} \times 840 = \text{Rs. } 360$$

120.(a) Let C.P. of each TV be Rs. x .

According to the question,
 $2(x - 9400) = 10600 - x$
 $\Rightarrow 2x - 18800 = 10600 - x$
 $\Rightarrow 3x = 10600 + 18800 = 29400$
 $\Rightarrow x = \frac{29400}{3} = \text{Rs. } 9800$

Alternatively :

Given : - loss : profit = 1 : 2

(-)	(+)
S.P. $\rightarrow$ 9400	10,600
↓	
1200	
1	2
↓	↓
400	800

$$\therefore \text{C.P.} = 9400 + 400 \text{ or } (10,600 - 800) = 9800$$

121.(a) Let C.P. of each watch = Rs. 1
 $\therefore$ Profit = C.P. of 4 watches = Rs. 4
 & C.P. of 14 watches = Rs. 14
 $\therefore$ S.P. of 14 watches = Profit + C.P. of 14 watches = 4 + 14 = 18
 but, the given S.P. of 14 watches = Rs. 450 $\times$ 14
 i.e. 18 units = 450 $\times$ 14

$$\therefore 1 \text{ unit} = \frac{450}{18} \times 14 = 350$$

i.e. C.P. of each watch = Rs. 350

122.(d) Let each article costs Rs. 1
 $\Rightarrow$ Cost of 200 articles = Rs. 200

200	
30%	70%
60	140
↓ +20%	↓ +10%
72	154

$$\Rightarrow \text{Total SP} = 154 + 72 = 226$$

$$\Rightarrow \text{Profit} = 226 - 200 = 26$$

$$\Rightarrow 26 \rightarrow 2600$$

$$\Rightarrow 1 \rightarrow 100$$

$$\Rightarrow \text{Cost Price of each article} = \text{Rs. } 100$$

123.(b) C.P. of 6 litre = 6x

$$\text{S.P. of } \left(\frac{6 + 2}{m \text{ w}} \right) = 8 \text{ litres} = 8 \times 2x = 16x$$

$$\text{Profit \%} = \frac{10x}{6x} \times 100 = 166.66\%$$

124.(a) $10\% = \frac{1}{10}$ & $20\% = \frac{1}{5}$

Let price of 1st cycle = Rs. C_1
& that of 2nd cycle = Rs. C_2

$$\therefore \frac{1}{10} C_1 + \frac{1}{5} C_2 = \text{Profit} \quad \dots\dots(i)$$

$$\text{and } \frac{1}{5} C_1 + \frac{1}{10} C_2 = \text{Profit} + 5 \quad \dots\dots(ii)$$

By (i) - (ii), we get

$$C_1 - C_2 = 5 \times 10 = \text{Rs. } 50 \quad \dots\dots(iii)$$

$$\text{and given, } C_1 + C_2 = \text{Rs. } 1600 \quad \dots\dots(iv)$$

On solving (iii) & (iv), we get

$$C_1 = 825 \text{ \& } C_2 = 775$$

Short-cut : when both are sold at certain profit

$$10\% = \frac{1}{10} \quad \& \quad 20\% = \frac{1}{5}$$

↓
LCM = 10

$$\& \text{ Ratio} = 10 : 5 = 2 : 1$$

difference=1

$$\therefore \text{Difference of prices} = C_1 - C_2$$

$$= \frac{\text{LCM} \times \text{profit difference}}{\text{Difference of ratio}} = \frac{10 \times 5}{1} = 50$$

$$\& \text{ given, } C_1 + C_2 = 1600$$

On solving both the above equations, we get

$$C_2 = 825/- \text{ \& } C_2 \text{ or } C_1 = 775/-$$

125.(d) According to the question,

$$\begin{array}{rcl} \text{Pen} & + & \text{Book} & \text{Profit} \\ -5\% & + & 15\% & = 7 \end{array} \quad \dots\dots(i)$$

$$+5\% + 10\% = 7 + 6 = 13 \quad \dots\dots(ii)$$

By (i) + (ii), we get,

$$25\% \text{ of Book} = 7 + 13 = 20$$

$$\Rightarrow \frac{1}{4} \text{ of Book} = 20$$

$$\Rightarrow \text{Price of Book} = 80$$

$$\therefore 10\% \text{ of book} = 10\% \text{ of } 80 = \text{Rs. } 8$$

$$\therefore \text{from (ii),}$$

$$5\% \text{ of pen} + 10\% \text{ of Book} = 13$$

$$5\% \text{ of pen} + 8 = 13$$

$$\Rightarrow \frac{1}{20} \text{ of pen} = 5$$

$$\Rightarrow \text{price of pen} = 20 \times 5 = \text{Rs. } 100$$

i.e. price of book = Rs. 80 & that of pen = Rs. 100

126. (b) CP : SP

$$\text{Apples} \rightarrow 10_{\times 8} : 16_{\times 8}$$

$$\text{Oranges} \rightarrow 16_{\times 5} : 12_{\times 5}$$

$$\text{Mangoes} \rightarrow 4_{\times 40} : 6_{\times 40}$$

Note: Ratio of CP is given 1 : 1 : 2.
So make the CP's in the same given ratio.

Now New Ratio,

$$\text{CP : SP}$$

$$\text{Apples} \rightarrow 80 : 128$$

$$\text{Oranges} \rightarrow 80 : 60$$

$$\text{Mangoes} \rightarrow 160 : 240$$

Now total CP of (1 apple + 2 oranges + 2 Mangoes)

$$= 1 \times 80 + 2 \times 80 + 2 \times 160$$

$$= 80 + 160 + 320 = \text{₹ } 560$$

Total SP of (1 apple + 2 oranges + 2 mangoes)

$$= 1 \times 128 + 2 \times 60 + 2 \times 240$$

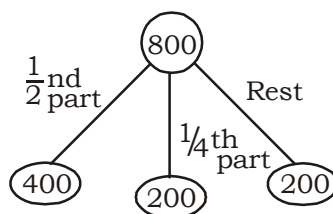
$$= 128 + 120 + 480 = \text{₹ } 728$$

$$\text{Profit} = (728 - 560) = \text{₹ } 168$$

$$\% \text{ profit} = \frac{168}{560} \times 100 = 30\%$$

127.(b) Let the total cost of goods = ₹ 800

According to the question,



$$\text{Total SP} = 400 \times \frac{130}{100} + 200 \times$$

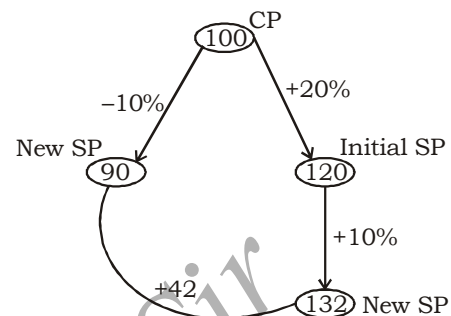
$$\frac{130}{100} \times \frac{85}{100} + 200 \times \frac{130}{100} \times \frac{70}{100}$$

$$\text{Total SP} = 520 + 221 + 182 = \text{₹ } 923$$

$$\text{Profit} = (923 - 800) = \text{₹ } 123$$

$$\% \text{ profit} = \frac{123}{800} \times 100 = 15.375\%$$

128.(c) Let the cost price of the article = ₹ 100.



Initial profit = 20%

$$\text{New profit} = \frac{42}{90} \times 100 = \frac{420}{9}\%$$

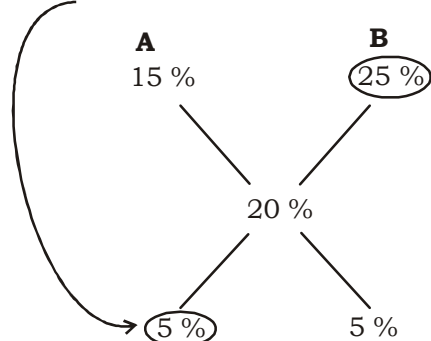
% change in profit

$$= \left(\frac{\frac{420}{9} - 20}{20} \right) \times 100 = \frac{240}{9 \times 20} \times 100$$

$$= \frac{1200}{9} = \frac{400}{3} = 133.33\%$$

129.(a)

because the CP's are same



So,

	CP	SP
A	100	115
B	100	125

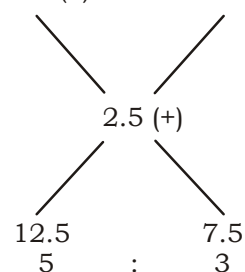
$$10 \text{ units} = 4800$$

$$100 \text{ units} = 48000$$

$$\text{CP of each cycle} = \text{Rs. } 48,000$$

130.(d) Horse Carriage

$$10\% (+) \quad 10\% (-)$$



$$\text{CP of Horse} = 8000 \times \frac{5}{8} = 5000$$

131. (b) $25\% = \frac{1}{4} \rightarrow \text{profit}$
 $15\% = \frac{3}{20} \rightarrow \text{profit}$
 $20 \rightarrow \text{cp}$

According to the question,
 Rakesh Yadav : Bhuvnesh

$$\begin{array}{lcl} \text{CP} \rightarrow & 3_{\times 23} & : \quad 20_{\times 4} \\ \text{SP} \rightarrow & 4_{\times 23} & : \quad 23_{\times 4} \\ \text{profit} \rightarrow & 1_{\times 23} & : \quad 3_{\times 4} \end{array}$$

Note: SP is same so equal both SP's
 Difference in profits = $23 - 12$
 $= 11 \text{ units}$

$$11 \text{ units} = 275 \text{ [Given]}$$

$$1 \text{ unit} = 25$$

$$\text{selling price} = 92 \times 25 = \text{₹ } 2300$$

132. (d) Profit = $12 \frac{1}{2}\% = \frac{1}{8}$

Note: Assume any value which is helpful in calculation.

Let initially amount paid by players = 64 units

New amount = 72 units

$$\begin{array}{lcl} \text{Initially} & : & \text{New} \\ \text{Amount} \rightarrow 64 & : & 72 \end{array}$$

$$24 \text{ players pays} = 72$$

$$1 \text{ player pays} = \frac{72}{24}$$

$$21 \text{ player pays} = \frac{72}{24} \times 21 = 63 \text{ units}$$

$$\text{Loss} = (64 - 63) = 1 \text{ unit}$$

$$1 \text{ unit} = \text{₹ } 30$$

$$63 \text{ units} = 30 \times 63$$

$$\text{Amount paid by 1 player} =$$

$$\frac{30 \times 63}{21} = \text{₹ } 90$$

133. (d) By Alligation rule,

$$\begin{array}{lcl} 50 \text{ pens} & & 100 \text{ pens} \\ +10\% & & x\% \end{array}$$

$$\begin{array}{c} \swarrow \quad \searrow \\ +15\% \\ \swarrow \quad \searrow \\ x-15 \quad 5 \end{array}$$

$$\text{i.e. } \frac{x-15}{5} = \frac{50}{100} \Rightarrow 2x-30=5$$

$$\Rightarrow 2x = 35$$

$$\Rightarrow x = \frac{35}{2} = 17 \frac{1}{2}\%$$

134. (a) Cost price of 1 orange

$$= \frac{8}{5} = \text{Rs. } 1.6$$

Selling price of 1 orange

$$= \frac{5}{2} = \text{Rs. } 2.5$$

(i) Profit percentage

$$= \frac{(2.5 - 1.6)}{1.6} \times 100$$

$$= \frac{0.9 \times 100}{1.6} \Rightarrow 56.25\%$$

(ii) Cost price of 300 oranges

$$= 1.6 \times 300 = \text{Rs. } 480$$

Selling price of 300 oranges

$$= 2.5 \times 300 = \text{Rs. } 750$$

$$\text{Profit} = \text{SP} - \text{CP} = 750 - 480 = \text{Rs. } 270$$

135. (b) Cost price of 100 eggs

$$= 1.20 \times 100 = \text{Rs. } 120$$

$$\text{Remaining eggs} = (100 - 4) = 96$$

Selling price of 12 eggs (a dozen)

$$= \text{Rs. } 15$$

$$\text{Selling price of 1 egg} = \text{Rs. } \frac{15}{12}$$

Selling price of 96 eggs

$$= \frac{15}{12} \times 96 = \text{Rs. } 120$$

136. (c) Cost price of sugar = $1600 \times 600 = \text{Rs. } 9,60,000$

Rate of profit = 7%

$$\text{Profit} = \frac{9,60,000 \times 7}{100}$$

$$= \text{Rs. } 67,200$$

$$\therefore \text{Selling price} = \text{Cost price} + \text{Profit}$$

$$\text{SP} = 9,60,000 + 67,200$$

$$= \text{Rs. } 10,27,200$$

137. (d) Cost price of wheat

$$= 200 \times 1200 = \text{Rs. } 2,40,000$$

Transportation and storage charges = Rs. 10,000

$$\text{Total CP} = 2,40,000 + 10,000$$

$$= \text{Rs. } 2,50,000$$

$$\text{Total SP of wheat} = 13 \times 200 \times 100 = \text{Rs. } 2,60,000$$

$$\text{Profit} = \text{SP} - \text{CP} = 2,60,000 - 2,50,000$$

$$= \text{Rs. } 10,000$$

Profit percentage

$$= \frac{10,000}{2,50,000} \times 100 = 4\%$$

138. (a) Selling price of color T.V. = Rs. 23520

Loss percentage = 4%

Cost price of the T.V.

$$= \frac{23520}{96} \times 100 = \text{Rs. } 24,500$$

Profit % = 8%

New selling price

$$= \frac{24500 \times 108}{100} = \text{Rs. } 26,460$$

139. (b) Cost price of 1200 eggs

$$= \frac{16}{12} \times 1200 = \text{Rs. } 1600$$

$$\text{Selling price} = 1600 \times \frac{115}{100}$$

$$= \text{Rs. } 1840$$

Selling price per dozen

$$= \frac{1840}{1200} \times 12 = \text{Rs. } 18.40$$

140. (a) Total cost price of two cars

$$= \text{Rs. } (18,000 + 15,000)$$

$$= \text{Rs. } 33,000$$

Selling price of the first car

$$= 18000 \times \frac{(100 - 15)}{100}$$

$$= \text{Rs. } 15300$$

Selling price of the second car

$$= 15000 \times \frac{(100 + 19)}{100} \Rightarrow \text{Rs. } 17850$$

$$\text{Total selling price} = \text{Rs. } (15300 + 17850)$$

$$= \text{Rs. } 33150$$

$$\text{Profit} = 33150 - 33000 = 150 \text{ Rs.}$$

$$\% \text{ profit} = \frac{150}{33000} \times 100 = \frac{5}{11}\%$$

Alternate:-

$$\text{Loss on first car} = 18000 \times \frac{15}{100}$$

$$= \text{Rs. } 2700$$

Profit on second car

$$= 15000 \times \frac{19}{100} = \text{Rs. } 2850$$

Profit on whole transaction

$$= (2850 - 2700) = \text{Rs. } 150$$

$$\% \text{ profit} = \frac{150}{(18000 + 15000)} \times 100$$

$$= \frac{5}{11}\% \text{ profit}$$

141.(a) Marked price = Rs. 450

$$\text{Markup percentage} = 12.5\% = \frac{1}{8}$$

CP	:	MP
8	:	9
↓ × 50		↓ × 50
400		450

Note: Always remember markup is calculated on the basis of CP while discount is calculated on the basis of MRP.

142.(d) Let CP of the article = Rs. 100

According to the question,

CP	SP	MP
100	120	150
	← -20%	
		← +50%

Profit percentage

$$= \frac{(120 - 100)}{100} \times 100 = 20\%$$

143.(b) Note: To get more details refer percentage chapter.

$$\text{loss}\% = \frac{(\text{Common gain or loss})^2}{10} \%$$

$$= \frac{(\text{gains or loss})^2}{100} \%$$

$$\text{loss}\% = \left(\frac{10}{10}\right)^2 = 1\%$$

Total SP of two watches = 2×200
= Rs. 400

$$\begin{aligned} \text{Net amount of Loss} &= \frac{400}{(100 - 1)} \times 1 \\ &= \text{Rs. } 4.04 \end{aligned}$$

Alternate: $10\% = \frac{1}{10}$

According to the question,

CP	:	SP
$10_{\times 11}$	:	$9_{\times 11}$
$10_{\times 9}$	:	$11_{\times 9}$

New ratio

CP	:	SP
110	:	99
90	:	99

Total	200	198
	← -2	

198 units = 400

$$1 \text{ unit} = \frac{400}{198} \Rightarrow 2 \text{ units}$$

$$= \frac{400}{198} \times 2 = \text{Rs. } 4.04$$

144.(a) Let the Cost price of two articles is x and y respectively.

According to the question,

$$x + y = 500 \dots (i)$$

$$\text{Loss}\% = \frac{(20)^2}{100} = 4\%$$

$$\text{Amount of loss} = \frac{500}{100} \times 4 = \text{Rs. } 20$$

Alternate: $CP_1 + CP_2 = 500$ [Given]

$$20\% = \frac{1}{5} \text{ P/L} \rightarrow (\text{Profit and Loss})$$

$$CP \quad 5_{\times 2} : 5_{\times 3}$$

$$SP \quad 6_{\times 2} : 4_{\times 3}$$

$$P/L \quad +1_{\times 2} : -1_{\times 3}$$

New ratio, [on equating the selling prices]

$$CP \quad 10 : 15$$

$$SP \quad 12 : 12$$

$$P/L \quad +2 : -3$$

According to the question,

Sum of Cost prices (10+15) units
= Rs. 500

$$\Rightarrow 25 \text{ units} = 500$$

$$1 \text{ unit} = \frac{500}{25} = 20$$

• Loss = 1 unit

Overall loss = $1 \times 20 = \text{Rs. } 20$ Hence the loss = **Rs. 20****145.(a)** According to the question,

CP of 15 articles = SP of 20 articles

$$15 \times CP = SP \times 20$$

$$\frac{CP}{SP} = \frac{20}{15}$$

$CP > SP$, therefore, there will be a loss.

$$\text{\% loss} = \frac{(20 - 15)}{20} \times 100 = 25\%$$

146.(a) According to the question,

SP of 10 Computers = CP of 12 Computers

$$10 \times SP = 12 \times CP$$

$$\frac{SP}{CP} = \frac{12}{10}$$

$SP > CP$, therefore, there will be a profit.

$$\text{\% profit} = \frac{(12 - 10)}{10} \times 100 = 20\%$$

147.(b) According to the question,

Let SP of 1 chocolate = Rs. 1

SP of 18 chocolate = Rs. 18

SP of 2 chocolate = Rs. 2

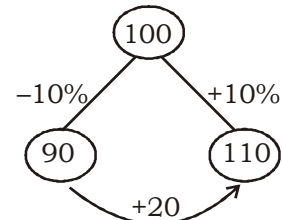
Loss = Rs. 2

Cost price = $18 + 2 = \text{Rs. } 20$

$$\text{\% loss} = \frac{2}{20} \times 100 = 10\%$$

148.(a) According to the question, the trader sells the articles worth Rs. 90 then he gains by articles worth Rs. 10.

$$\begin{aligned} \text{Hence profit \%} &= \frac{10}{90} \times 100 \\ &= 11\frac{1}{9}\% \end{aligned}$$

149.(b) Let the actual CP = Rs. 100

$$\begin{aligned} \text{\% profit} &= \frac{20}{90} \times 100 = \frac{200}{9} \\ &= 22\frac{2}{9}\% \end{aligned}$$

150.(d) Let SP of the article = 6 units

$$\therefore \text{CP of the article} = 6 \times \frac{5}{6} = 5 \text{ units}$$

$SP > CP$, So therefore, there will be a profit.

$$\text{\% profit} = \frac{(6 - 5)}{5} \times 100 = 20\%$$

151.(b) Let CP of the article = 20 units

MP of the article = 30 units

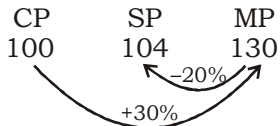
$$\begin{aligned} \therefore \text{SP of the article} &= 30 \times \frac{9}{10} \\ &= 27 \text{ units} \end{aligned}$$

$SP > CP$, Therefore there will be a profit.

$$\text{\% profit} = \frac{(27 - 20)}{20} \times 100 = 35\%$$

152.(c) Let the CP of the article = Rs. 100

According to the question



Discount % = 20%

$$\text{Discount} = \frac{130 \times 20}{100} = \text{Rs. } 26$$

$$\% \text{ Profit} = \frac{(104 - 100)}{100} \times 100 = 4\%$$

$$\mathbf{153.(c)} \quad 4\% = \frac{1}{25}, \quad \frac{25}{6}\% = \frac{1}{24}$$

According to the question,

$$\begin{array}{cc} \text{CP} & : & \text{SP} \\ 25 & : & 24 \\ \downarrow \times 24 & & \downarrow \times 24 \end{array}$$

$$600 \quad : \quad 576$$

New Ratio of CP and SP

$$\begin{array}{cc} \text{CP} & : & \text{SP} \\ 24 & : & 25 \\ \downarrow \times 25 & & \downarrow \times 25 \end{array}$$

$$600 \quad : \quad 625$$

 $\therefore$ Hence SP of the article= **Rs. 625****154.(d)** Let the cost price of the article = Rs. x Case 1 : Profit = $(56 - x)$ Case 2 : Profit = $(42 - x)$

According to the question,

$$\frac{(56 - x)}{x} \times 100 = \frac{(42 - x)}{x} \times 100 \times 3$$

$$56 - x = 126 - 3x$$

$$2x = 70$$

$$x = 35$$

Cost price of the article = **Rs. 35****Alternate**

$$\begin{array}{cc} \text{SP}_1 & : & \text{SP}_2 \\ 56 & : & 42 \\ & \nearrow +14 & \\ & 3 & : & 1 \end{array}$$

$$\text{Profit} \rightarrow 3 \quad : \quad 1$$

$$+2 \quad \nearrow$$

$$2 \text{ units} = 14$$

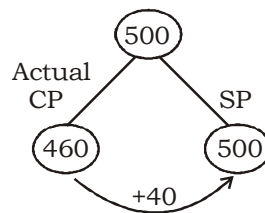
$$1 \text{ unit} = \frac{14}{2} = 7$$

$$3 \text{ units} = 3 \times 7 = 21$$

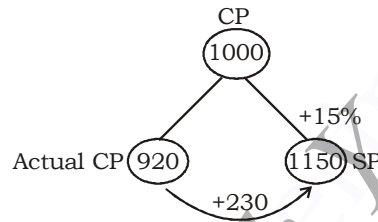
$$\text{CP} = \text{SP} - \text{Profit} = 42 - 7 = \text{Rs. } 35$$

or

$$\text{CP} = 56 - 21 = \text{Rs. } 35$$

155.(c) Let the price of 1 gm = Rs. 1 $\therefore$ According to the question,

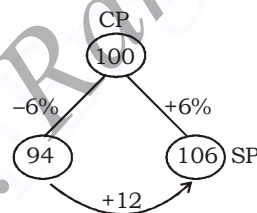
$$\begin{aligned} \% \text{ profit} &= \frac{40}{460} \times 100 = \frac{200}{23} \\ &= 8 \frac{16}{23}\% \end{aligned}$$

156.(c) Let the price of 1 kg = Rs. 1000 $\therefore$ According to the question,

$$\begin{aligned} \Rightarrow \text{Actual profit \%} &= \frac{230}{920} \times 100 \\ &= 25\% \end{aligned}$$

157.(c) Let the cost price = 100 units

According to the question,



$$12 \text{ units} = 6$$

$$1 \text{ unit} = \frac{6}{12} = \frac{1}{2}$$

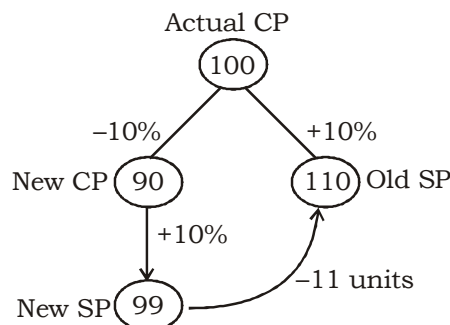
Cost price of the article

$$= \frac{1}{2} \times 100 = \text{Rs. } 50$$

158.(b) Let the cost price of the bicycle

= 100 units

According to the question,



$$11 \text{ units} = 132$$

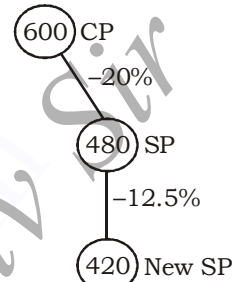
$$1 \text{ unit} = \frac{132}{11} = 12$$

$$\text{Actual CP (100 units)} = 12 \times 100 = \text{Rs. } 1200$$

159.(c) CP of the article = Rs. 600

Loss % = 20%

According to the question,



New SP = Rs. 420

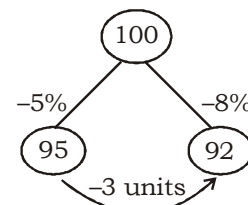
Alternate: Let SP = Rs. x

$$20\% = \frac{1}{5}, \quad 12.5\% = \frac{1}{8}$$

$$x = 600 \times \frac{4}{5} \times \frac{7}{8} = \text{Rs. } 420$$

160.(b) Let the marked price of the article = 100 units

According to the question,



$$3 \text{ units} = 36$$

$$1 \text{ unit} = \frac{36}{3} = 12$$

$$100 \text{ units} = 12 \times 100 = \text{Rs. } 1200$$

 $\therefore$ MP of the bulb = Rs. 1200**161.(a) Note :** If a commission of $a\%$ is given marked price and a shopkeeper earns $P\%$ profit.

Then Ratio of CP and MP-

$$\begin{array}{cc} \text{CP} & : & \text{MP} \\ (100 - a) & : & (100 + p)\% \end{array}$$

Now from above result,

$$\begin{array}{cc} \text{CP} & : & \text{MP} \\ (100 - 10) & : & (100 + 20) \\ 90 & : & 120 \end{array}$$

$$\begin{array}{ccc} \text{CP} & : & \text{SP} & : & \text{MP} \\ 90 & : & 102 & : & 120 \end{array}$$

$$\text{Profit\%} = \frac{12}{90} \times 100 = \frac{40}{3} = 13 \frac{1}{3}\%$$

162.(d) Discount % = 15%
 Selling price = Rs. 5865
 Marked price

$$= \frac{5865}{(100 - 15)} \times 100 = \text{Rs. } 6900$$

 Discount = 6900 - 5865 = Rs. 1035

Alternate: Discount = $\frac{5865}{(100 - 15)} \times 15$
 = Rs. 1035

163.(c) According to the question,

$$\begin{array}{ccc} \text{CP} & : & \text{MP} \\ (100 - 10) & : & (100 + 17) \\ 90 & : & 117 \end{array}$$

+27

Required percentage

$$= \frac{27}{90} \times 100 = \mathbf{30\%}$$

164.(b)

$$\begin{array}{ccc} \text{CP} & : & \text{MP} \\ (100 - 25) & : & (100 + 12.5) \\ 75 & : & 112.5 \\ 2 & : & 3 \\ \downarrow \times 300 & & \downarrow \times 300 \\ \boxed{600} & : & 900 \end{array}$$

Cost price of the article = **Rs. 600**

165.(c)

	Rs.	Quantity
Cost price	2	: 3
Selling price	$1_{\times 3}$	$1_{\times 3}$

Note : In such type of questions to make calculation easier equal the quantity of articles bought and sold.

Now According to the question,

$$\begin{array}{ccc} \text{Quantity bought} & : & \text{Profit} \\ 3 & : & 1 \\ \downarrow \times 10 & & \downarrow \times 10 \\ \boxed{30} & & 10 \end{array}$$

We need to buy 30 apples to make a profit of Rs. 10.

166.(a) Cost price of Akash helicopter = Rs. 28,000

Selling price for Rakesh Yadav

$$= 28000 \times \frac{(100 - 10)}{100}$$

$$= \text{Rs. } 25,200$$

Selling price for Bhuvnesh

$$= \frac{20000 \times 88}{100} + \frac{8000 \times 92}{100}$$

$$= 17600 + 7360$$

= Rs. 24960

Difference between selling prices

$$= 25200 - 24960 = \mathbf{Rs. } 240$$

Alternate:

Discount given by Rakesh Yadav

$$= 28000 \times \frac{10}{100} = \text{Rs. } 2800$$

Discount given by Bhuvnesh

$$= 20,000 \times \frac{12}{100} + \frac{8000 \times 8}{100}$$

$$\Rightarrow \text{Rs. } 3040$$

Note: Cost price is same in both cases so the difference in selling price is same as difference in discount.

$\therefore$ Difference in discount

$$= (3040 - 2800) = \text{Rs. } 240$$

167.(b) Loss % = -10%, Profit % = 15%

By alligation Rule,

$$\begin{array}{ccc} -10\% & & 15\% \\ & \searrow \quad \nearrow & \\ & 0 & \rightarrow \text{No profit / No loss} \end{array}$$

$$\begin{array}{ccc} \text{Ratio of Cost Price} & : & 10 \\ 15 & : & 10 \\ \rightarrow 3 & : & 2 \end{array}$$

According to the question,

Let $CP_1 = 300$ units, $CP_2 = 200$ units

$$SP_1 = \frac{300 \times 90}{100} = 270 \text{ units}$$

$$SP_2 = \frac{200 \times 115}{100} = 230 \text{ units}$$

$$\text{Total SP} = 270 + 230 = 500 \text{ units}$$

$$500 \text{ units} = \text{Rs. } 30,000$$

$$1 \text{ unit} = \text{Rs. } 60$$

$$100 \text{ units} = \text{Rs. } 60 \times 100 = \text{Rs. } 6000$$

$$\text{Difference in cost prices} = \mathbf{Rs. } 6000.$$

Alternate:

Let CP of both the articles are x and y respectively.

According to the question,

$$10x = 15y$$

$$\frac{x}{y} = \frac{3}{2}$$

$$\text{Ratio of cost prices} = 3 : 2$$

Note : Now further you can solve the question same as above.

168.(b) Total Cost price of milk

$$= 6 \times x = \text{Rs. } 6x$$

Total selling price of milk

$$= (6 + 2) \times 2x = \text{Rs. } 16x$$

$$\text{Profit \%} = \frac{(16x - 6x)}{6x} \times 100$$

$$= \frac{10x}{6x} \times 100$$

$$\text{Profit \%} = \mathbf{166\frac{2}{3}\%}$$

Note : For easy calculation you can assume any value of x , and then solve the question,

Alternate :

$$\text{Let } x = 1$$

$$\therefore \text{CP} = 6, \text{ SP} = (6 + 2) \times 2 = 16$$

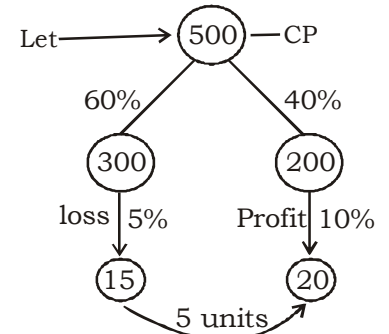
$$\% \text{ profit} = \frac{(16 - 6)}{6} \times 100$$

$$= 166\frac{2}{3}\%$$

169.(c) Let the quantity of the goods = 500 kg

Cost of 1 kg goods be Rs. 1.

$\therefore$ According to the question,



$$5 \text{ units} = \text{Rs. } 100, 1 \text{ unit} = \text{Rs. } 20$$

$$500 \text{ units} = \text{Rs. } 20 \times 500$$

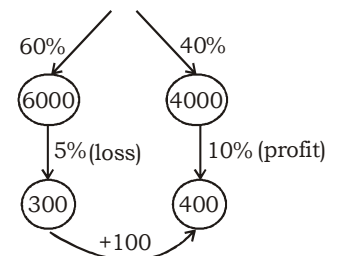
$$= \text{Rs. } 10,000$$

The worth of goods = Rs. 10,000

Alternate:-

Note $\rightarrow$ To save your valuable time you can take help from options.

Option (c) $\rightarrow$ 10000 $\rightarrow$ Total Worth



Difference in both = **Rs. 100**

And same is given in question. So option (c) is correct.

170.(c) Let the price of 1 kg tea = Rs. 1
Mark price of 21 kg tea = Rs. 21

$$\text{Cost price of 21 kg tea} = \frac{20 \times 90}{100}$$

= Rs. 18

Note: Retailer got 1 kg tea free so the cost price will not include of 1 kg tea.

$$\begin{aligned} \therefore \% \text{ profit} &= \frac{(21-18)}{18} \times 100 \\ &= \frac{1}{6} \times 100 = 16\frac{2}{3}\% \end{aligned}$$

171.(d) Note: To save your valuable time we can solve these type of questions on the basis of percentage fractions.

$$75\% = \frac{3}{4}, \quad 30\% = \frac{3}{10}$$

CP	SP	
4	7	Same in both cases
10	7	

$$\text{Total} \rightarrow 14 \quad 14$$

$\therefore$ CP = SP Therefore, there will be no profit no loss.

172.(d) Profit Percentage = $40\% = \frac{2}{5}$

Let CP = 500 then SP = 700
After selling on 20% discount then SP

$$= \frac{700 \times 80}{100} = \text{Rs. } 560$$

$$\% \text{ profit} = \frac{(560-500)}{500} \times 100$$

$$= \frac{60}{500} \times 100 = 12\%$$

173.(b) Note → In such type of question to save your valuable time or make your calculation easier equal the quantity of articles.

	Rate	:	Quantity
CP →	$1_{\times 2}$		$18_{\times 2}$
SP →	$1_{\times 3}$		$12_{\times 3}$

$$\text{Profit} = 3 - 2 = \text{Rs. } 1$$

$$\% \text{ profit} = \frac{1}{2} \times 100 = 50\%$$

174.(a) Let CP of the article = 100 units

$$\therefore \text{SP} = \frac{120}{100} \times 100 = 120 \text{ units}$$

$$\text{MP} = \frac{120}{(100-20)} \times 100 = 150 \text{ units}$$

$$\begin{array}{ccc} \text{CP} & : & \text{SP} & : & \text{MP} \\ 100 & & 120 & & 150 \end{array}$$

$$100 \text{ units} = \text{Rs. } 1920$$

$$1 \text{ unit} = \text{Rs. } \frac{1920}{100}$$

$$120 \text{ units} = \frac{1920}{100} \times 120$$

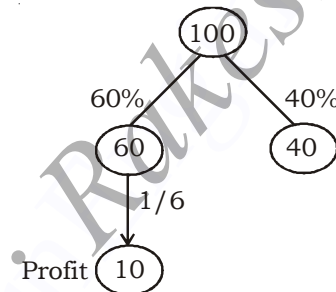
$$= \text{Rs. } 2304$$

175.(c) Note: In such type of questions no need to use cost price of the article you can take any value of cost price to make your calculation easier.

Let CP of the article = Rs. 100

According to the question,

$$\left[\therefore 16.66\% = \frac{1}{6} \right]$$



overall loss = Rs. 14

Loss on Remaining article

$$= 14 + 10 = \text{Rs. } 24$$

$$\begin{aligned} \therefore \text{Required loss \%} &= \frac{24}{40} \times 100 \\ &= 60\% \end{aligned}$$

176.(a) $66\frac{2}{3}\% = \frac{2}{3}$

According to the question,

Let,

CP	SP	MP
1	1	3
	+2	-2

Note: In question given that there is no loss,

$$\text{CP} = \text{SP}$$

minimum markup percentage

$$= \frac{2}{1} \times 100 = 200\%$$

177.(a) Cost price : Marked price

$$2 : 3$$

Let profit = $3x\%$, discount = $2x\%$

$$\text{CP} : \text{MP}$$

$$(100-2x) : (100+3x)$$

Note: To calculate direct relation between cost price and market price, we discussed it in earlier question.

According to the question,

$$\frac{100-2x}{100+3x} = \frac{2}{3}$$

$$\begin{aligned} 300-6x &= 200+6x \\ 12x &= 100 \end{aligned}$$

$$x = \frac{100}{12} = \frac{25}{3}$$

$$\text{Discount} = 2x = 2 \times \frac{25}{3} = 16.66\%$$

Alternate:

Let CP = 200, MP = 300,

Let profit = $3x\%$, Discount = $2x\%$

$$200 \times \frac{(100+3x)}{100} = 300 \times \frac{(100-2x)}{100}$$

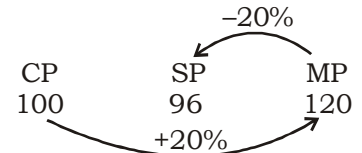
$$200 + 6x = 300 - 6x$$

$$12x = 100$$

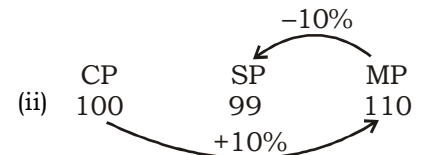
$$2x = 16.66\%$$

$$\text{Discount \%} = 16.66\%$$

178.(d) (i) Let CP = 100



$$\text{Loss} = 4\%$$



$$\text{Loss} = 1\%$$

Note → The value is dependent upon the markup (%) or discount (%), So Hence we can't be determined.

179.(c) According to the question,
 $(12 \times 20 + 8 \times 10)\% - (20 \times 15)\% = \text{Rs. } 36$

$$320\% - 300\% = 36$$

$$1\% = \frac{36}{20}$$

$$100\% = \frac{36}{20} \times 100 = \text{Rs. } 180$$

Cost price of the camera = Rs. 180

Alternate:-

Note → We can solve this question by help of options also.

Option (c) →

$$\left(180 \times 12 \times \frac{120}{100} + 180 \times 8 \times \frac{110}{100}\right) -$$

$$\left(180 \times 20 \times \frac{115}{100}\right)$$

$$(18 \times 144 + 144 \times 11) - (36 \times 115)$$

$$144 \times 29 - 36 \times 115$$

$$36[116 - 115] = 36$$

The difference is same as mention in question

so option (c) is correct.

180.(d) CP of the car = Rs. 3,00,000

$$\text{Profit} = 3,00,000 \times \frac{10}{100} = 30,000$$

CP of the bike = Rs. 1,00,000

$$\text{Loss} = 1,00,000 \times \frac{20}{100} = 20,000$$

$$\text{Net profit} = 30,000 - 20,000 = 10,000$$

$$\text{Profit\%} = \frac{10000}{400000} \times 100$$

$$= \frac{5}{2} = 2.5\%$$

181.(b) Let Marked price (MP) = Rs. 1 per kg

Then,

Weight	MP	Rate
100	100	$\frac{100}{100} = 1$
↓ -4%	↓ -20%	
96	80	$\frac{80}{96} = \frac{5}{6}$

$$\text{Effective discount} = 1 - \frac{5}{6} = \frac{1}{6}$$

$$\% \text{ discount} = \frac{1}{6 \times 1} \times 100 = 16\frac{2}{3}\%$$

Alternate →

Quantity : Rate : Rate/Kg

20	400	$\frac{400}{20} = 20$
↓ -4%	↓ -20%	
96	320	$\frac{320}{96} \times 5 = \frac{50}{3}$
$\frac{96}{5}$		

$$\text{Effective discount} = 20 - \frac{50}{3} = \frac{10}{3}$$

$$\% \text{ discount} = \frac{10}{3 \times 20} \times 100 = 16\frac{2}{3}\%$$

182.(b) Note : In such type of questions assume any value of cost prices but ratio should be same as given in question.

	A	B	C
Cost price →	100	200	400
	↓ ×2	↓ ×5	↓ ×2
Total Cost price →	200	1000	800
	↓ +10%	↓ +20%	↓ +25%
Profit →	20	200	200
Total cost price =	200 + 1000 + 800		
	= 2000		
Profit =	20 + 200 + 200 = 420		

$$\% \text{ Profit} = \frac{420}{2000} \times 100 = 21\%$$

$$\text{183.(c)} \quad 25\% = \frac{1}{4}, \quad 16.66\% = \frac{1}{6},$$

$$33.33\% = \frac{1}{3}$$

Original marked price = Rs. 400

$$\therefore \text{Cost price} = \frac{400}{4} \times 3 = \text{Rs. } 300$$

Let original SP = 6x

New SP = 7x

According to the question,

	CP	:	SP
Old →	300		6x
New →	300		7x
	$(7x - 300) = 2(6x - 300)$		
	$7x - 300 = 12x - 600$		
	$5x = 300$		
	$x = 60$		

New SP = 7x = 7 × 60 = **Rs. 420**

Alternate:

Note → In such type of questions please take help from options to save your valuable time, and then satisfy the question conditons.

Option (c) → New SP = Rs. 420

$$\text{Old SP} = \frac{420}{7} \times 6 = \text{Rs. } 360$$

$$\text{CP} = 400 \times \frac{3}{4} = \text{Rs. } 300$$

$$\text{Old profit} = 360 - 300 = \text{Rs. } 60$$

$$\text{New profit} = 420 - 300 = \text{Rs. } 120$$

Note → Profit is doubled and the same is mention in the question. Hence option (c) is Correct.

$$\text{184.(a)} \quad 30\% = \frac{3 \rightarrow \text{Profit}}{10 \rightarrow \text{SP}}$$

$$\text{CP} = \text{SP} - \text{Profit} = 10 - 3 = 7$$

$$\% \text{ Actual profit} = \frac{3}{7} \times 100$$

$$= \frac{300}{7} = 42\frac{6}{7}\%$$

185.(c) Cost price of an article A = Rs. 160

$$\text{Selling price of A} = 160 \times \frac{120}{100}$$

$$= \text{Rs. } 192$$

According to the question,

Cost price of B = Rs. 192

Selling price of B = Rs. 240

$$\text{Profit} = 240 - 192 = \text{Rs. } 48$$

$$\% \text{ Profit} = \frac{48}{192} \times 100 = 25\%$$

Alternate:

	A	B
CP	160	192
	↓ +20%	↓ +48
SP	192	240

$$\% \text{ profit} = \frac{48}{192} \times 100 = 25\%$$

186.(c) SP of each cow = Rs. 9900

$$10\% = \frac{1}{10}, \quad 20\% = \frac{1}{5}$$

	I st	II nd
CP	10 _{×4}	5 _{×11}
	↓ +1	↓ -1
SP	11 _{×4}	4 _{×11}

$$\text{P/L} \quad 1_{\times 4} \quad -1_{\times 11}$$

[∴ SP is equal]

$$\text{Total loss} = (11 - 4) = 7 \text{ units}$$

$$\text{Selling price} = 44 \text{ units}$$

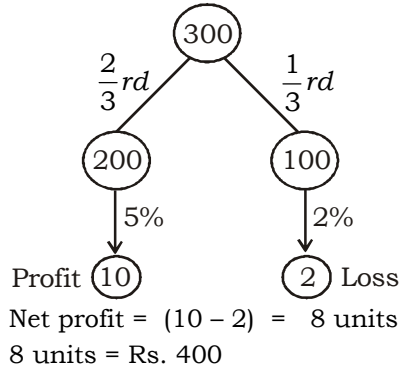
$$44 \text{ units} = \text{Rs. } 9900$$

$$1 \text{ unit} = \frac{9900}{44}$$

$$7 \text{ units} = \frac{9900}{44} \times 7 = \text{Rs. } 1575$$

187.(a) Let the value of consignment = 300 units

According to the question,



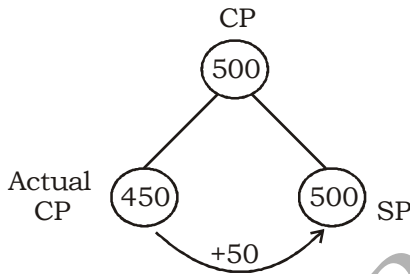
$$1 \text{ unit} = \frac{400}{8} = \text{Rs. } 50$$

$$300 \text{ units} = 50 \times 300 = \text{Rs. } 15,000$$

188.(b) Let CP of 1 gm is Rs. 1.
Cost price of the fruits = Rs. 450
Selling price of the fruits = Rs 500
Profit = (500 - 450) = Rs. 50

$$\% \text{ Profit} = \frac{50}{450} \times 100 = 11 \frac{1}{9} \%$$

Alternate:



$$\% \text{ profit} = \frac{50}{450} \times 100 = 11 \frac{1}{9} \%$$

189.(b) Let he bought x bananas.

According to the question,

Condition (i) When he sold bananas @ Rs. 3/ banana.

Then, CP = $3x + 20$ (i)

@ Rs. 3.25/ banana.

$\therefore$ CP = $3.25x - 30$ (ii)

From equation (i) & (ii)

$$3x + 20 = 3.25x - 30$$

$$0.25x = 50$$

$$x = \frac{50}{0.25} = 200$$

$\therefore$ So we can say, he bought 200 bananas.

Alternate → Note → In such type of questions please take help from options to save your valuable time.

Option (b)

$$200 \times 3.25 - 200 \times 3 = 50$$

The difference is same as given in question.

So option (b) is correct.

Alternate (2) → Difference in Rate per banana

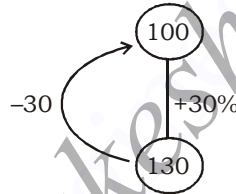
$$= (3.25 - 3) = \text{Rs. } 0.25$$

Rate : Quantity

$$\begin{array}{cc} 0.25 & 1 \\ \downarrow \times 200 & \downarrow \times 200 \\ \text{Actual difference} \rightarrow 50 & \boxed{200} \end{array}$$

(30 + 20)

190.(a) Note → For detailed solution of such type of questions refer percentage chapter.



Reduction in number of egg percentage

$$= \frac{30}{130} = \frac{3}{13}$$

10 → New

13 → Actual

$$3 \text{ units} = 3$$

$$1 \text{ unit} = 1$$

$$10 \text{ units} = 1 \times 10 = 10$$

$$\text{Present price} = \frac{9.10}{10} = \text{91 paise}$$

191.(c) Listed price of the washing machine = Rs. 10,000

$$10\% = \frac{1}{10}, 20\% = \frac{1}{5}$$

$$\text{Cost price} = 10,000 \times \frac{9}{10} \times \frac{4}{5} = \text{Rs. } 7200$$

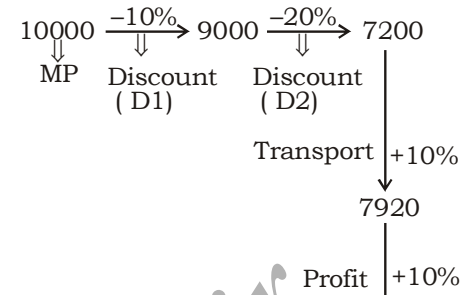
Cost price after transport Cost

$$= 7200 + 7200 \times \frac{10}{100} = \text{Rs. } 7920$$

$$\text{Selling price} = 7920 \times \frac{11}{10}$$

$$= \text{Rs. } 8712$$

Alternate:



SP 8712

192.(c) Selling price of the watch = Rs. 405

Loss = 10%

$\therefore$ Cost price of the watch

$$= \frac{405}{90} \times 100 = 450$$

New selling price = 465

$$\% \text{ profit} = \frac{465 - 450}{450} \times 100$$

$$= \frac{1}{30} \times 100 = \frac{10}{3} \%$$

$$\% \text{ profit} = 3 \frac{1}{3} \%$$

Alternate: According to the question,

$$405 \text{ Rs.} = 90\%$$

$$1 \text{ Rs.} = \frac{90}{405} \%$$

$$465 \text{ Rs.} = \frac{90}{405} \times 465\% = 103 \frac{1}{3} \%$$

$$\% \text{ profit} = \left(103 \frac{1}{3} - 100 \right) \%$$

$$\% \text{ profit} = 3 \frac{1}{3} \%$$

$$\text{193.(c)} \quad 10\% = \frac{1}{10}, \quad \frac{25}{11} \% = \frac{1}{44}$$

Let the production cost = Rs. x

According to the question,

$$x \times \frac{11}{10} \times \frac{45}{44} \times \frac{11}{10} = 990$$

$$x = \frac{990 \times 44 \times 100}{11 \times 11 \times 45} = \text{Rs. } 800$$

Alternate:

CP	SP
10	11
10	11
44	45
4400	5445

$$5445 \text{ units} = \text{Rs. } 990$$

$$1 \text{ unit} = \frac{990}{5445}$$

$$4400 \text{ units} = \frac{990}{5445} \times 4400 \\ = \text{Rs. } 800$$

- 194.(b)** According to the question,
4% of CP = (1080 - 1026)
4% of CP = 54

$$1\% \text{ of CP} = \frac{54}{4}$$

$$\text{CP} = \frac{54}{4} \times 100 = \text{Rs. } 1350$$

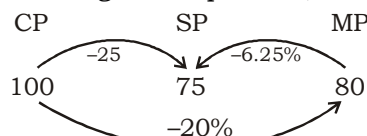
$$\text{SP} = \frac{1350 \times 104}{100} = \text{Rs. } 1404$$

Alternate:

Note: Try to write all the statements in one line to save your valuable time.

$$\text{SP} = \frac{(1080 - 1026)}{4} \times 104 \\ = \frac{54}{4} \times 104 = \text{Rs. } 1404$$

- 195.(b)** Let the cost price = 100 units
According to the question,



$$25 \text{ units} = \text{Rs. } 37.5$$

$$1 \text{ unit} = \frac{37.5}{25}$$

$$100 \text{ units} = \frac{37.5}{25} \times 75$$

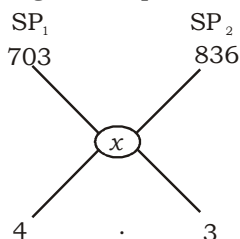
$$= \text{Rs. } 112.5$$

- 196.(a) Note:** In such type of questions try to solve the question by alligation method to save your valuable time.

$$25\% = \frac{1}{4}, \text{ Profit} = 4, \text{ Loss} = 3$$

Let the Cost price = x

According to the question,



$$\frac{703 \times 4 + 836 \times 3}{4 + 3} = x \Rightarrow x = \text{760}$$

$$\text{New selling price} = 760 \times \frac{120}{100} \\ = \text{Rs. } 912$$

Alternate:

Note: To find the value of x quickly follow the given below method.

- (i) Divide the difference of SP_1 and SP_2 in the given ratio.

$$(836 - 703) = \frac{133}{7}$$



$$4 \text{ units} = \frac{133}{7} \times 4 = 76$$

$$3 \text{ units} = \frac{133}{7} \times 3 = 57$$

$$\text{CP} = 836 - 76 = \text{Rs. } 760$$

$$\text{New SP} = 760 \times \frac{120}{100} = \text{Rs. } 912$$

- 197.(b)** Cost price of the calculator = Rs. 800

According to the question,

$$\text{Market price of the calculator} \\ = \frac{800}{80} \times 100 = \text{Rs. } 1000$$

New Cost price

$$= 1000 \times \frac{(100 - 15)}{100} = \text{Rs. } 850$$

$$\text{Required amount} = 850 - 800 \\ = \text{Rs. } 50$$

Alternate:

Note: Try to solve such type of questions in a line to save your valuable time.

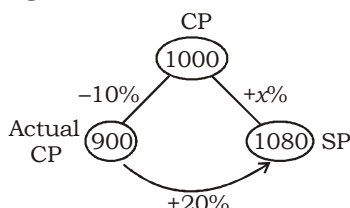
Required amount

$$= \frac{800}{80} \times (20 - 15) = \text{Rs. } 50$$

- 198.(b)** Let the CP of 1 gm weight is Re 1

According to the question,

But he weights 900 gm for every 1000 gm



$$x\% = \left(\frac{1080 - 1000}{1000} \right) \times 100 = 8\%$$

Thus, the markup value = **8%**

- 199.(c)** Given CP of 40 books = Rs. 3200

According to the question,

SP of 40 books = CP of 40 books + SP

of 8 books

$$[\therefore \text{SP} = \text{CP} + \text{PROFIT}]$$

SP of 32 books = Rs. 3200

$$[\therefore \text{CP of 40 books} = 3200]$$

SP of 1 book = Rs. 100

SP of 1 dozen books = Rs. 1200

- 200.(b)** According to the question,

Condition (i): A calculates his profit on sell in g price.

$$\therefore \text{Profit for A} = 1800 \times \frac{20}{100}$$

$$= \text{Rs. } 360$$

Condition (ii): B calculates his profit on cost price.

$$\therefore \text{Profit for B} = \frac{1800}{120} \times 20$$

$$= \text{Rs. } 300$$

Difference in profit = Rs. (360 - 300)

$$= \text{Rs. } 60$$

Alternate: $20\% = \frac{1}{5}$

	A	B
CP	4 _{×6}	5 _{×5}
SP	5 _{×6}	6 _{×5}
Profit/Loss	1 _{×6}	1 _{×5}

According to the question,

Note: SP is same in both cases.

30 units = Rs. 1800

$$1 \text{ unit} = \frac{1800}{30} = \text{Rs. } 60$$

$$\text{Difference} = (6 - 5) \times 60 = \text{Rs. } 60$$

- 201.(a)** According to the question,

$$\text{Cost price for A} = \frac{1818}{90} \times 100$$

$$\text{Cost price for B} = \frac{1818}{101} \times 100$$

Ratio of Cost price of A and B

$$= \frac{1818 \times 101}{90 \times 1818} = 101 : 90$$

Alternate: $10\% = \frac{1}{10}$, $1\% = \frac{1}{100}$

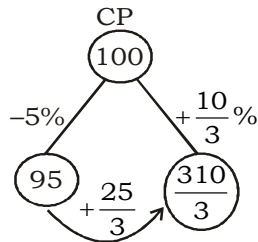
$$\begin{array}{lcl} & \text{CP} & \text{SP} \\ \text{A} \rightarrow & 10_{\times 101} & 9_{\times 101} \\ \text{B} \rightarrow & 100_{\times 9} & 101_{\times 9} \end{array}$$

Note → SP is equal

$$\therefore \frac{\text{CP of A}}{\text{CP of B}} = \frac{1010}{900} = \frac{101}{90}$$

202.(c) Let the Cost price of the article = 100 units

According to the question,



$$\frac{25}{3} \text{ units} = \text{Rs. } 65$$

$$1 \text{ unit} = \text{Rs. } \frac{65 \times 3}{25}$$

$$100 \text{ units} = \frac{65 \times 3}{25} \times 100 = \text{Rs. } 780$$

Cost price = Rs. 780, Selling price = Rs. 936 (given)

$$\% \text{ Profit} = \frac{(936 - 780)}{780} \times 100$$

$$= \frac{156}{780} \times 100 = 20\%$$

Alternate:**Note:** Try to write the solution in one line to save your valuable time.

$$\text{Rs. } 65 = \left(5 + \frac{10}{3}\right) = \frac{25}{3}\%$$

$$\text{Rs. } 936 = \frac{25}{3 \times 65} \times 936 = 120\%$$

Note → CP would be 100% and SP = 120%

$$\text{SP \% profit} = 120 - 100 = 20\%$$

203.(c) Note: We have discussed earlier how to write the direct relation between CP and MP.

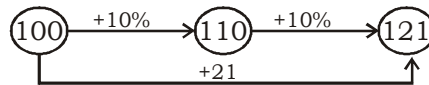
$$\begin{array}{ccc} \text{CP} & : & \text{MP} \\ (100 - q) & : & (100 + p) \\ & \nearrow & \\ & + (p+q) & \end{array}$$

% Markup value

$$= \frac{(p+q)}{(100-q)} \times 100$$

Note: In such type of questions we can assume any value of p and q and then satisfy the options to get answer.**204.(c)** Let us assume initially he has 100 litre of milk and CP of 1 litre is Re1.

∴ According to the question,



$$\% \text{ Profit} = \frac{21}{100} \times 100 = 21\%$$

Alternate:-**Note:** In such type of questions we can also use the below given formula.

$$\left[x + y + \frac{xy}{100} \right]$$

$$\text{Profit \%} = 10 + 10 + \frac{10 \times 10}{100} = 21\%$$

205.(a) Let the Cost price of the watch = Rs. x

According to the question,

$$\Rightarrow x + \frac{x \times x}{100} = 96$$

$$[\therefore \text{SP} = 96 \text{ (given)}]$$

$$\Rightarrow \frac{x^2}{100} = 96 - x$$

$$\Rightarrow x^2 = 9600 - 100x$$

$$\Rightarrow x^2 + 100x - 9600 = 0$$

After solving $x = 60$

∴ New selling price

$$= 60 + \frac{60 \times 120}{100} = \text{Rs. } 132$$

Alternate:-**Note:****(1)** In such type of questions take help from options to save your valuable time.**(2)** First try to satisfy the given value 96.

Let CP = 60

$$\text{SP} = 60 + \frac{60 \times 60}{100} = \text{Rs. } 96 \text{ [satisfy the given data]}$$

$$\text{New SP} = 60 + \frac{60 \times 120}{100} = \text{Rs. } 132$$

$$\text{206.(a)} \quad 25\% = \frac{1 \rightarrow \text{kerosine}}{4 \rightarrow \text{petrol}}$$

Condition (i):

	Petrol	:	Kerosine
Quantity →	4	:	1
Price →	2	:	1
Total →	8	:	1

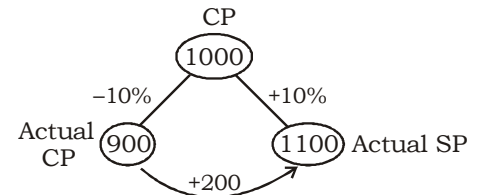
Condition (ii):

Total quantity of petrol = (4 + 1) = 5

Total price = 5 × 2 = Rs. 10

$$\% \text{ Profit} = \frac{(10 - 9)}{9} \times 100$$

$$= 11\frac{1}{9}\%$$

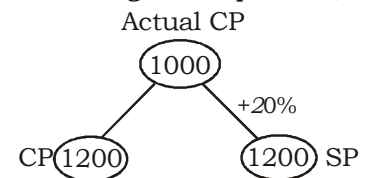
207.(b) Let the Cost price of 1 gm weight is Re. 1

$$\% \text{ profit} = \frac{200}{900} \times 100 = 22\frac{2}{9}\%$$

208.(c) Let the Cost price of 1 gm weight is Re. 1.

∴ He pays Rs. 1200 for Rs. 1000

According to the question,

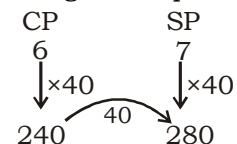


∴ CP and SP is same so there is no profit and loss, in the whole transaction.

$$\text{209.(b)} \quad 14\frac{2}{7}\% = \frac{1}{7}$$

SP = 7 units, CP = (7 - 1) = 6 units

According to the question,



$$\begin{aligned}\% \text{ Actual profit} &= \frac{40}{240} \times 100 \\ &= 16\frac{2}{3}\%\end{aligned}$$

$$\mathbf{210.(c)} \quad 40\% = \frac{2}{5}$$

Let CP = 5 units then SP = 3 units

$$\begin{array}{ccc} \text{CP} & : & \text{SP} \\ 5 & : & 3 \end{array}$$

Old SP = $3 \times 3 = 9$ units

$$\% \text{ Profit} = \frac{(9-5)}{5} \times 100 = 80\%$$

Alternate:

Note: We can also solve this question by the help of options.

Option (c): Let CP = 100,
Profit = 80%

$$\text{SP} = 100 \times \frac{180}{100} = 180$$

$$\text{New SP} = \frac{180}{3} = 60$$

$$\text{Loss} = \frac{(100-60)}{100} \times 100 = 40\%$$

Hence, option (c) is correct, because it satisfies the question condition.

211.(a) Let the actual cost price = Rs. 100

According to the question,

Actual	CP	SP	Profit
→ 100	100	120	20
	+20%	+25%	
New	120	150	

Note : SP = 150, Profit = 25%

$$\text{CP} = \frac{150}{125} \times 100 = \text{Rs. } 120$$

Hence % increment

$$= \frac{(120-100)}{100} \times 100 = 20\%$$

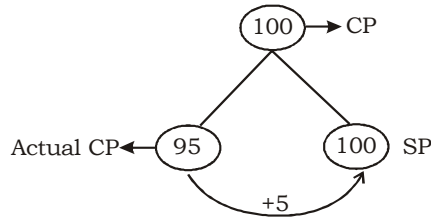
$$\mathbf{212.(b)} \quad 6.66\% = 6\frac{2}{3}\% = \frac{1}{15}$$

$$\begin{array}{ccc} \text{Discount} & : & \text{MP} \\ 1 & : & 15 \\ \downarrow \times 25 & & \downarrow \times 25 \\ 25 & & 375 \end{array}$$

$$\begin{aligned}\text{Money paid by Abhinav} \\ &= 375 - 25 = \text{Rs. } 350\end{aligned}$$

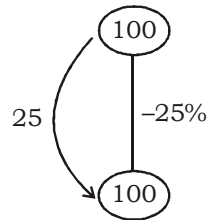
213.(c) Let the price of 1 litre petrol is Re 100

According to the question,



$$\% \text{ Profit} = \frac{5}{95} \times 100 = \frac{100}{19} = 5.26\%$$

214.(b) Note : for question 82 and 83 refer percentage chapter for detailed solutions.

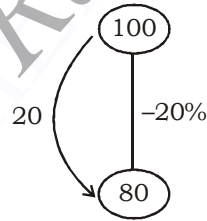


$$\% \text{ Reduction} = \frac{25}{75}$$

$$= \frac{1}{3} = \frac{4 \rightarrow \text{new}}{3 \rightarrow \text{old}}$$

$$\text{Original price} = \frac{16}{4 \times 3} = \text{Rs. } 1.33$$

215.(a) Same as ques. 82



$$\% \text{ Reduction} = \frac{20}{80}$$

$$= \frac{1}{4} = \frac{5 \rightarrow \text{new}}{4 \rightarrow \text{old}}$$

$$\text{Original price} = \frac{240}{4 \times 6} = \text{Rs. } 10/\text{kg}$$

216.(d) It is very simple. The examiner wants to check your presence of mind.

So, the profit percent to the retailer = 25%

217.(b) According to the question,

Condition (i) : He bought 2 bajaj discover (BD) then total = 2 BD + 1 BD

↓
(free)

Condition (ii) : He bought 3 bajaj pulser (BP) then Total

$$= 3 \text{ BP} + 1 \text{ BP}$$

↓

(free)

Total Bikes = 3 BD + 4 BP

$$\begin{aligned}\text{Total cost} &= 67500 + 232500 \\ &= \text{Rs. } 300000\end{aligned}$$

Required selling price

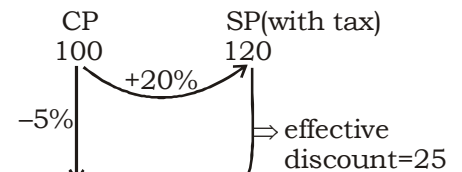
$$= 3,00,000 \times \frac{117.5}{100}$$

$$= \text{Rs. } 352500$$

Note: In this question examiner wants to check the intelligency so focus on the given information.

218.(c) Let the cost price of mobile = 100 units

According to the question,



$$\begin{aligned}\text{Effective discount} &= (120 - 95) \\ &= 25 \text{ units}\end{aligned}$$

$$95 \text{ units} = 3325$$

$$1 \text{ unit} = \frac{3325}{95}$$

$$25 \text{ units} = \frac{3325}{95} \times 25 = \text{Rs. } 875$$

Discount = **Rs. 875**

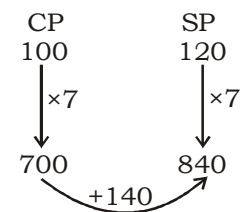
219.(c) Let the cost price of the bicycle = Rs. 100

Profit % = 140% (given)

$$\text{SP} = 100 \times \frac{240}{100} = \text{Rs. } 240$$

Let initially 1 bicycle being sold.
Now number of bicycle being sold

$$= 1 \times \frac{(600+100)}{100} = 7$$



[∴ SP is reduced by 50%]

$$\text{So new profit} = 840 - 700 = \text{Rs. } 140$$

Since the initial profit is same as the new.

So there is no increase in percentage.

$$\begin{array}{lcl} \text{220.(a)} & \text{CP} & : \quad \text{SP} \\ & (100 - 12) & : (100 + 32) \\ & 88 & : 132 \end{array}$$

Now according to the question,

$$\text{SP} = 132 \times \frac{(100 - 20)}{100}$$

$$\text{SP} = 105.6$$

$$\text{Profit \%} = \frac{(105.6 - 88)}{88} \times 100$$

$$= \frac{17.6}{88} \times 100 = 20\%$$

221.(d) Note : In such type of questions calculate the ratio of cost price to selling price. It can help you in saving your time.

Linc pens 481 SP = 650CP	Cello pens 629 SP = 408CP
CP : SP 37 : 50	CP : SP 37 : 24
+13	-13

$$\% \text{ Profit} = \frac{13}{37} \times 100\%$$

$$\% \text{ Loss} = \frac{13}{37} \times 100\%$$

Since, profit = loss

Hence option (d) is correct.

222.(a) Let cost price of the article for A = Rs. 100

According to the question,

$$\begin{array}{ccccccc} \text{A} & & \text{B} & & \text{C} & & \text{M} \\ 100 & \xrightarrow{+20\%} & 120 & \xrightarrow{+10\%} & 132 & \xrightarrow{9.09\%} & 120 & \xrightarrow{+10\%} & 132 \\ & & & & & & & & \uparrow \\ & & & & & & & & 143 \end{array}$$

+8.33%

Now CP for A = Rs. 143

SP for A = Rs. 120

Loss = 143 - 120 = Rs. 23

$$\text{Actual \% loss} = \frac{23}{100} \times 100 = 23\%$$

Note : Remember : $20\% = \frac{1}{5}$,

$$10\% = \frac{1}{10},$$

$$9.09\% = \frac{1}{11}, \quad 8.33\% = \frac{1}{12}$$

Alternatively:

CP SP

5 6

10 11

11 10

10 11

12 13

after simplified $\rightarrow 100 \quad 143$

A sells article to B at 20% profit

$\therefore$ So SP = 120

Net loss = 143 - 120 = 23

$$\text{Actual \% loss} = \frac{23}{100} \times 100 = 23\%$$

223.(a)

Employees	Old 3	:	New 2
	$\times$		$\times$
Wages	20	:	27
Total wages	60	:	54
			-6

$$\begin{aligned} \% \text{ Reduction in wages} &= \frac{6}{60} \times 100 \\ &= 10\% \end{aligned}$$

Note : Total wages = no. of employees $\times$ wage per employee

224.(c) Let the marked price for my watch = 100 units

$$\text{Discount} = \frac{100 \times 25}{100} = 25 \text{ units}$$

Remaining amount paid by me

= 100 - 25 = 75 units

• 25 units = Rs. 940

$$1 \text{ unit} = \text{Rs. } \frac{940}{25}$$

$$75 \text{ units} = \text{Rs. } \frac{940}{25} \times 75$$

= Rs. 2820

Alternate:-

(1) Note $\rightarrow$ To save your valuable time we can take help from options and then satisfy the question condition.

Option (c) $\rightarrow$ Total Cost price = 940 + 2820 = Rs. 3760

$$\text{Discount} = \frac{3760 \times 25}{100} = \text{Rs. 940}$$

Now the value is same as mention in question condition. So option (c) is correct.

$$\begin{array}{lcl} \text{225.(a)} & \text{A} & : \quad \text{B} \\ \text{Capital} \rightarrow & 54,000 & : \quad 90,000 \\ & 3 & : \quad 5 \end{array}$$

Total profit = Rs. 3600

Profit recieved by B = (3600 - 1800) = **Rs. 1800**

Note $\rightarrow$ Profit would be divided in the ratio of their capital.

5 units = Rs. 1800

1 unit = Rs. 360

3 units = Rs. 360 $\times$ 3 = Rs. 1080

Profit of A (excluding commission) = Rs. 1080

Commission = (1800 - 1080) = Rs. 720

$$\text{Required \%} = \frac{720}{3600} \times 100 = 20\%$$

226. (c) Let the Cost price of 1 gm goods is Re. 1

$\therefore$ According to the question,

	CP	
	1000	
Actual CP	(880)	(1000 + 10k)
		(120 + 10k)

Profit = 1000 + 10k - 880 = (120 + 10k)

$$\Rightarrow \frac{(120 + 10k)}{880} \times 100 = 25$$

$$\Rightarrow 120 + 10k = 220$$

$$\Rightarrow k = \frac{(220 - 120)}{10} = 10\%$$

$$\Rightarrow k = 10\%$$

Alternate:-

Note $\rightarrow$ In such type of question take help from options to save your valuable time.

Option : (b)

	CP	
	1000	
Actual CP	(880)	(1100) SP
		+220

$$\% \text{ profit} = \frac{220}{880} \times 100 = \mathbf{25\%}$$

% profit is same as mention in question so option (c) is correct.

$$\mathbf{227.(c)} \quad 9.09\% = \frac{1}{11} = \frac{12 \rightarrow \text{SP}}{11 \rightarrow \text{CP}}$$

$$\begin{array}{ccc} \text{SP} & & \text{CP} \\ 12 & : & 11 \\ \downarrow \times 4 & & \downarrow \times 4 \\ 48 & & 44 \end{array}$$

Now by alligation,

$$\begin{array}{ccc} \text{CP} & & \text{SP} \\ 48 & & x \\ & \searrow & \nearrow \\ & (44) & \\ & \nearrow & \searrow \\ 12 & : & 3 \\ 4 & : & 1 \end{array}$$

$$\frac{48 \times 4 + x \times 1}{5} = 44$$

$$192 + x = 220$$

$$x = 28/\text{litre}$$

Alternate →

Let the price of speed (SP) = Rs. x/litre

According to the question,

$$12 \times 48 + 3x = (12 + 3) \times 48 \times \frac{11}{12}$$

$$576 + 3x = 60 \times 11 \left[\because 9.09\% = \frac{1}{11} \right]$$

$$3x = 84$$

$$x = \text{Rs. } 28/\text{litre}$$

228.(b)

$$\begin{array}{ccc} \text{A} & : & \text{B} & : & \text{C} \\ \text{Investment} \rightarrow & 3x & : & 4x & : & 5x \\ \text{Rate of return} \rightarrow & 6y\% & : & 5y\% & : & 4y\% \end{array}$$

$$\text{return (profit)} \rightarrow \frac{18xy}{100} : \frac{20xy}{100} : \frac{20xy}{100}$$

$$\text{Total profit} = \frac{1}{100} \times [18xy + 20xy + 20xy]$$

$$\text{Total profit} = \frac{1}{100} \times 58xy$$

According to the question,

$$\frac{20xy}{100} - \frac{18xy}{100} = 250$$

$$2xy = 250 \times 100 \Rightarrow xy = 125 \times 100$$

$$\therefore \text{Total profit} = \frac{58}{100} \times 125 \times 100 = \mathbf{\text{Rs. } 7250}$$

229.(c) Note → (1) This question is totally based on your intelligency. Language is lengthy but there is no need to calculate it.

$$\text{Actual discount} = 10 + 5 - \frac{10 \times 5}{100} = \mathbf{14.5\%}$$

Note → (2)

$$\text{Net discount} \left[X + Y - \frac{XY}{100} \right]$$

Alternate →

$$\begin{array}{ccccc} & & \text{Price after} & & \text{After 2nd} \\ & & \text{1st discount} & & \text{discount} \\ \text{MP} & & & & \\ 100 & \xrightarrow{-10\%} & 90 & \xrightarrow{-5\%} & 85.5 \end{array}$$

$$\text{Net discount} = (100 - 85.5) = \mathbf{14.5\%}$$

230.(c) Let he should sell the house at Rs. x.

According to the question,

$$x = 8 \times \frac{(100 - 20)}{100} \times \frac{(100 - 10)}{100} \times \frac{(100 + 10)}{100} \times \frac{(100 + 25)}{100}$$

$$x = 8 \times \frac{80}{100} \times \frac{90}{100} \times \frac{110}{100} \times \frac{125}{100}$$

$$x = \mathbf{\text{Rs. } 7.92 \text{ Lakh}}$$

$$\mathbf{231.(d)} \quad \text{Price of 10 chairs} = 10 \times 200 = 2000$$

Price of 12 chairs without discount

$$= 12 \times 200 = \text{Rs. } 2400$$

After discount price of 12 chairs

$$= 10 \times 200 + 80 \times 2 = \text{Rs. } 2160$$

$$\% \text{ discount} = \frac{(2400 - 2160)}{2400} \times 100$$

$$\% \text{ discount} = \frac{240}{2400} \times 100 = \mathbf{10\%}$$

232.(a) According to the question,

$$\begin{array}{ccccccc} \text{I}^{\text{st}} & & \text{II}^{\text{nd}} & & \text{III}^{\text{rd}} & & \text{IV}^{\text{th}} & & \text{V}^{\text{th}} \\ 400 & \xrightarrow{-10\%} & 360 & \xrightarrow{-10\%} & 324 & \xrightarrow{-10\%} & 291.6 & \xrightarrow{60\%} & 240 \end{array}$$

$$\text{Total charges} = 400 \times 5 = \text{Rs. } 2000$$

Charges paid by customer

$$= 400 + 360 + 324 + 291.6 + 240 = \mathbf{\text{Rs. } 1615.6}$$

% Discount

$$= \frac{(2000 - 1615.6)}{2000} \times 100$$

$$\% \text{ Discount} = \frac{384.4}{2000} \times 100 = \mathbf{19.22\%}$$

Note:- In such type of questions we can assume any value instead of 400, and then follow the same procedure that will give the same answer.

233.(b) Note:- In such type of questions assume any value of required terms and then satisfy the relation.

Case (I) →

$$\begin{array}{ccc} \text{Cost price (C)} & \text{Selling price (S)} & \text{Profit (Z)} \\ 100 & 120 & 20\% \\ \downarrow +100 & \downarrow +100 & \downarrow \text{decrease} \\ 200 & 220 & 10\% \end{array}$$

Case(II) →

$$\begin{array}{ccc} \text{Cost price (C)} & \text{Selling price (S)} & \text{Loss (Z)} \\ 100 & 80 & 20\% \\ \downarrow +100 & \downarrow +100 & \downarrow \text{decrease} \\ 200 & 180 & 10\% \end{array}$$

So we can say, Z will decrease if the cost price and the selling price both are increased by same amount.

234.(c) According to the question,

$$\mathbf{\text{Case (i) : } 12 \text{ CP} = 9 \text{ SP}}$$

$$\frac{\text{CP}}{\text{SP}} = \frac{9}{12} = \frac{3}{4}$$

$$\% \text{ profit} = \frac{(4 - 3)}{3} \times 100 = \frac{100}{3} \%$$

Case (ii) : 10 Discount = profit 5

$$10 \text{ D} = 5 \text{ P}$$

$$\frac{\text{D}}{\text{P}} = \frac{5}{10} = \frac{1}{2}$$

Note → Now we see profit is double than discount.

$$\therefore \text{Discount (D)} = \frac{100}{3 \times 2} = \frac{50}{3} \%$$

$$\text{Required diff.} = \left(\frac{100}{3} - \frac{50}{3} \right) \%$$

$$= \frac{50}{3} \% = 16\frac{2}{3} \%$$

235.(b) Total Cost of 4 cars = 1 + 2
= 3 lakh

Total SP of 4 cars = 3 × 1.5

= 4.5 lakh

SP of 1 car = 1.2 lakh

SP of rest 3 cars = (4.5 - 1.2)

= 3.3 lakh

$$\text{Average SP of all 3 cars} = \frac{3.3}{3}$$

= 1.1 lakh

236.(d) Setting up Cost = Rs. 2800

Cost of paper and ink

$$= \frac{2000}{100} \times 80 = \text{Rs. } 1600$$

$$\text{Cost of printing} = \frac{2000}{100} \times 160$$

= Rs. 3200

Total Cost = (2800 + 1600 + 3200)

= Rs. 7600

Selling price of 1500 books

= 1500 × 5 = Rs. 7500

$$\text{Total Profit} = \frac{7500 \times 25}{100}$$

= **Rs. 1875**

Money from advertisement

= (7600 - 7500) + 1875 = **Rs. 1975**

237.(a) Per call charges in february

$$\text{month} = \frac{350}{150} = \frac{7}{3}$$

Per call charges in March month

$$= \frac{350 + 50 \times 1.4}{250} = \frac{420}{250} = \frac{42}{25}$$

$$\text{Required \%} = \frac{\frac{7}{3} - \frac{42}{25}}{\frac{7}{3}} \times 100 = 28\%$$

238.(d) Note : While solving this type of question we should first make number of article sold and bought equal.

No. of pen Rupees

Buy $\left[\begin{array}{l} 4 \longrightarrow 15 \\ \text{or } 12 \longrightarrow 45 \end{array} \right.$

Sell

$\left[\begin{array}{l} 6 \longrightarrow 25 \\ \text{or } 12 \longrightarrow 50 \end{array} \right.$

Hence if he bought 12 pens and sold all then he got

a profit of Rs. (50 - 45) = Rs. 5

To make a profit of Rs. 25 the number of pens bought by him

$$= \frac{25}{5} \times 12 = 60 \text{ pens}$$

hence he has bought 60 pens.

Profit percentage

$$= \frac{50 - 45}{45} \times 100$$

$$= \frac{5}{45} \times 100 = \frac{1}{9} \times 100 = 11\frac{1}{9} \%$$

239.(a) Condition (I):-

S.P. of 200 - CP of 200 = S.P. of 40

⇒ S.P. of 160 = C.P. of 200

Profit percentage

$$= \frac{200 - 160}{160} \times 100 = 25\% \text{ Condition (II):}$$

dition (II):

C.P. of 200 - S.P. of 200 = S.P. of 40.

⇒ C.P. of 200 = S.P. of 240.

$$\text{loss percentage} = \frac{240 - 200}{240} \times 100$$

$$= \frac{40}{240} \times 100 = 16\frac{2}{3} \%$$

Hence, Required Difference

$$= 25 - 16\frac{2}{3} = 8\frac{1}{3} \%$$

Note: While calculating profit or loss over the number of article we calculate it on selling price.

240.(c) Let 1gm costs 1 rupee then -

Actual cost Cost Cost paid by customer
 $\downarrow$ $\downarrow$ $\downarrow$
 900 $\xrightarrow{-100}$ 1000 $\xrightarrow{+20\%}$ 1200
 Hence, his actual profit

$$= \frac{1200 - 900}{900} \times 100$$

$$= \frac{300}{900} \times 100 = 33\frac{1}{3} \%$$

241.(a) Let the cost of first watch be C_1 and that of

second be C_2 . Then by question:-

$$\frac{6}{5} C_1 = \frac{3}{4} C_2$$

$$\frac{C_1}{C_2} = \frac{3}{4} \times \frac{5}{6}$$

$$\frac{C_1}{C_2} = \frac{5}{8}$$

$$\Rightarrow C_1 : C_2 = 5 : 8$$

$$\Rightarrow C_1 = \frac{5}{13} \times 1950 = 750$$

$$\Rightarrow C_2 = \frac{8}{13} \times 1950 = 1200$$

Alternate:

$$20\% = \frac{1}{5}, 25\% = \frac{1}{4}$$

$$\text{CP } 5_{\times 1} \quad 4_{\times 2}$$

SP $6_{\times 1} \quad 3_{\times 2}$

After making SP equal

$$\text{CP } 5 \quad 8 = 13$$

$$\text{SP } 6 \quad 6 = 12$$

$$13 \text{ units} = 1950$$

$$1 \text{ units} = 150$$

$$\text{CP for I}^{\text{st}} \text{ watch} = 5 \times 150 = 750$$

$$\text{CP for II}^{\text{nd}} \text{ watch} = 8 \times 150 = 1200$$

242.(b) Let the cost price of first and second scooter be P_1 and P_2

$$\text{Then } \frac{6}{5} \times P_1 = 40,000$$

$$P_1 = \frac{1,00,000}{3}$$

$$\text{also } \frac{4}{5} \times P_2 = 40,000$$

$$P_2 = 50,000$$

Cost price of both the scooter

$$= P_1 + P_2$$

$$= \frac{2,50,000}{3}$$

Selling price of both the scooter
 = 2 × 40,000 = 80,000

Loss suffered by man

$$= \frac{2,50,000}{3} - 80,000 = \frac{10,000}{3}$$

$$\text{Loss percentage} = \frac{\frac{10,000}{3}}{\frac{2,50,000}{3}} \times 100$$

$$= 4\% \downarrow$$

Note:- In such type of question loss/profit can be calculated as follows:-
Loss/profit = 20% - 20% -

$$\frac{20 \times 20}{100} \% = -4\% \text{ (loss)}$$

243.(d) Let the production cost of the radio be x. Then
According to the question :

$$x \times \left(\frac{6}{5}\right) \times \left(\frac{11}{10}\right) \times \left(\frac{3}{4}\right) = 2475$$

$$\Rightarrow x = \text{Rs } 2500$$

244.(d) Selling price of all three cows = 8000 + 12000 + 6000 = 26,000
Since he has made 30% on overall transaction.

So, the cost price of all three cows

$$= \frac{10}{13} \times 26,000 = 20,000$$

While the cost price of first cow

$$= \frac{4}{5} \times 8,000 = 6400$$

Cost price of second cow

$$= \frac{5}{6} \times 12000 = 10000$$

Hence, cost of third cow

$$= [20000 - (10,000 + 6,400)] = 3,600$$

245.(a) Since $12\frac{1}{2}\% = \frac{1}{8}$,

$$6\frac{1}{4}\% = \frac{1}{16}$$

Required amount

$$= \left(\frac{9}{8}\right) \times \left(\frac{16}{15} \times 7500\right) = 9,000$$

246.(b) Let the initial cost price of buffalo be 100 units.

Cost price	→	Selling price	
100	→	108	
↓ -20%			
80	→ +40%	112	+4 unit
But 4 units = Rs 640			
1 unit = Rs 160			
100 units = Rs 16,000			

Hence, the cost price of buffalo = Rs 16000

247.(c) Profit at selling price

$$= \frac{1 \rightarrow \text{Profit}}{5 \rightarrow \text{S.P.}}$$

$$\{\because \text{C.P.} = \text{S.P.} - \text{Profit}\}$$

$$\text{Profit at cost price} = \frac{1 \rightarrow \text{Profit}}{4 \rightarrow \text{C.P.}}$$

Hence, the cost price of commodity

$$= \frac{4}{5} \times 1200 = 960$$

$$\text{Required selling price} = \frac{4}{3} \times 960$$

$$= \text{Rs } 1280$$

248.(c) Let profit made on cow is x and the loss be y rupees then.

$$15000 + y = 18000 - x$$

$$15000 + y = 18000 - \frac{1}{5}y$$

$$\left[\because x = \frac{20}{100} \times y \right]$$

$$\frac{6}{5}y = 3000$$

$$y = 2500$$

Hence, the cost of the cow = 15000 + 2500 = 17,500

249.(d)

	Pencil	Rupees
1 st	6 →	20
	or	
	24 →	80

	Pencil	Rupees
II nd	8 →	26
	or	
	24 →	78
	or	
	48 →	156

Now after mixing in the ratio

2 : 1 pencil

becomes (24 + 48) = 72

So, he bought 72 pencil for Rs 236

While he sold 24 pencil for Rs 118

or 72 pencil for Rs 354

Hence profit %

$$= \frac{354 - 236}{236} \times 100$$

$$= \frac{118}{236} \times 100 = 50\%$$

250.(d) To avoid calculation we will calculate it at quantity.

So, to get 15% profit on 180 quintal we must have a profit

$$= \frac{15}{100} \times 180 = 27 \text{ quintal}$$

10% profit at 80 quintal

= 8 quintal profit

20% profit at 70 quintal

= 14 quintal profit

Required profit at remaining 30 quintal

$$= [27 - (14 + 8)] = 5 \text{ quintal}$$

$$\text{Profit percentage} = \frac{5}{30} \times 100$$

$$= \frac{100}{6} \% \text{ or } \frac{1}{6}$$

Hence remaining quantity must be

sold at $\frac{7}{6}$ of the cost price.

$$\text{i.e. } \frac{7}{6} \times 600 = \text{Rs } 700 \text{ per quintal}$$

251.(b)

CP	SP	MRP
$9 \times \left(4 \xrightarrow{+25\%} 5\right)$		
	$9 \xleftarrow{-10\%} 10 \times 5$	
36	45	50
↓ ×30		↓ ×30
1080		1500

Hence MRP must be Rs 1500.

Alternatively:-

Remember this relation between C.P and MRP

100		100
CP		MRP
100 - discount		100 ± profit/loss
So, Now		

100		100
100 - 10		100 + 25
90		125
↓ ×12		↓ ×12
1080		1500

252.(d) Let CP be 100 units

CP	MRP	SP
100	$\xrightarrow{+50\%} 150$	$\xrightarrow{-15\%} 127.5$
	27.5 units	
27.5 units	→	165
150 units	→	$\frac{150}{27.5} \times 165$

MRP of the book = Rs 900

253.(a) Cost price of the mixture

$$= 25 \times \frac{10}{11}$$

$$= \text{Rs } \frac{250}{11}$$

By mixture and alligation:-

$$\begin{array}{r}
 \text{I} \quad 20 \quad \text{II} \quad 25 \\
 \swarrow \quad \searrow \\
 \quad 250 \\
 \swarrow \quad \searrow \\
 \frac{25}{11} \quad \frac{30}{11} \\
 \downarrow \times 12 \quad \downarrow \times 12 \\
 \frac{60}{72}
 \end{array}$$

Hence quantity of second Pulse is 72 kg

254.(d) Let cost of one kg tea be $100x$ and cost of one kg coffee be $100y$.

Then, $100x + 4 \times 100y = 300$

$$100x + 400y = 300 \quad \dots (1)$$

By (II) condition

$$20x + 40y = 34$$

Multiplying by 5 in both sides

$$\Rightarrow 100x + 200y = 170 \quad \dots (II)$$

Subtraction (2) from (1)

$$\text{We get } 200y = 130$$

Cost of 1 kg coffee $100y = \text{Rs } 65$

$$\text{By (1) } 100x + 260 = 300$$

Cost of 1kg tea $100x = \text{Rs } 40$

Alternate:- $x + 4y = 300$

put the values of tea and coffee in place of x and y and match the options.

255.(d) Let the price of pen = Rs x
Than profit percentage = Rs. $x\%$

$$\text{Hence S.P.} = x \times \left(\frac{100 + x}{100} \right)$$

$$x \times \left(\frac{100 + x}{100} \right) = 39$$

$$100x + x^2 = 3900$$

$$x^2 + 100x - 3900 = 0$$

$$\Rightarrow x^2 + 130x - 30x - 3900 = 0$$

$$\Rightarrow (x + 130)(x - 30) = 0$$

$$\Rightarrow x = 30, \text{ and } x \neq -130$$

Hence cost price of pen = Rs. 30

Note: This type of questions can be done through options saving your precious time during exam.

256.(a)

$$\begin{array}{ccc}
 \text{Apples} & & \text{Rupees} \\
 12 & \longrightarrow & 15 \\
 \downarrow \times 25 & & \downarrow \times 25 \\
 \hline 300 & & \hline \text{Rs. } 375
 \end{array}$$

for 40 % profit total selling price of $(300 - 50) = 250$

$$\text{Apples must be} = \frac{14}{10} \times 375 = 525$$

So, per dozen selling price of the apples

$$= \frac{12}{250} \times 525 = \text{Rs. } 25.20$$

257.(d)

$$\begin{array}{ccccc}
 \text{CP} & & \text{SP} & & \text{List price} \\
 3 \times (10 \xrightarrow{+30\%} 13 & & (3 \xleftarrow{-25\%} 4) \times 13 & & \\
 \hline 30 & \longrightarrow & 39 & \longleftarrow & 52 \\
 \text{9 units} & \longleftarrow & \text{13 units} & &
 \end{array}$$

so, 9 units = Rs. 90

1 units = Rs. 10

13 units = Rs. 130

hence the amount he gives as discount = Rs. 130

258.(b) cost of all the machines = $7 \times 3500 = 24500$

$$\text{Cost of packaging} = \frac{1}{10} \times 24500$$

Now the total cost of all machines = $24500 + 2450 = 26950$

to get a profit of Rs. 3050 selling price must be

$$= 26950 + 3050 = 30,000$$

But this selling price is 75% of the marked price as 25% discount has been given.

So, the marked price of all the machines combinedly

$$= \frac{4}{3} \times 30,000 = 40,000$$

259.(d) Let the price of one cow be $100x$ and that of a buffalo be $100y$ then by question $5 \times 100x + 13 \times 100y = 51000$ or $500x + 1300y = 51000 \dots (I)$
Again by question.

$$\frac{15}{100} \times 500x - \frac{10}{100} \times 1300y = 1150$$

$$75x - 130y = 1150 \quad \dots (II)$$

multiply by 10 in (II) and adding in (I) we get.

$$500x + 1300y = 51000$$

$$750x - 1300y = 11500$$

$$\hline 1250x = 62500 \\ x = 50$$

$$\Rightarrow \text{Price of cow } 100x = \text{Rs. } 5000$$

$$\text{By (I) } 1300y = 26000$$

$$100y = \text{Rs. } 2000$$

Price of buffalo = Rs. 2000

Price of 2 cows and 3 buffaloes = $2 \times 5000 + 3 \times 2000 = 16000$

260.(c) let cost price of first and second watch be x & y . Since there is no profit and no loss during the transaction hence the loss incurred at the first is equal to profit made at second

$$\text{i.e. } \frac{12}{100} \times x = \frac{12}{100} \times y$$

$$\Rightarrow x = y$$

Hence price of each watch

$$= \frac{3360}{2} = 1680$$

261.(d) Let production cost be 100
Then,

production cost $\rightarrow$ Selling price $\rightarrow$ List price

$$\begin{array}{ccccc}
 100 & \xrightarrow{\times \frac{119}{100}} & 119 & \xrightarrow{\times \frac{100}{85}} & 140 \\
 \downarrow & & \downarrow & & \downarrow \\
 112 & \xrightarrow{+18.90} & 130.90 & \xleftarrow{-15\%} & 154
 \end{array}$$

New profit percentage

$$= \frac{18.90}{112} \times 100 = 16.875\%$$

262.(d) Articles sold at 20% profit

$$= \left[1 - \left(\frac{1}{3} + \frac{3}{5} \right) \right]$$

$$= \frac{1}{15} \text{ of the total articles}$$

So, the total profit on all the articles is given by

$$\text{profit\%} = \frac{1}{3} \times 14\% + \frac{3}{5} \times \frac{35}{2}\%$$

$$+ \frac{1}{15} \times 20\% = \frac{99}{6}\% = 16.50\%$$

263. (a)

$$\begin{array}{ccccc}
 \text{B} & & \text{A} & & \text{C} \\
 10 & \longrightarrow & 9 & & 10 \\
 \hline 110 & : & 99 & : & 90 \\
 \downarrow \times \frac{1}{11} & & & & \downarrow \times \frac{1}{11} \\
 \hline \text{Rs. } 10 & & & & \text{Rs. } \frac{90}{11}
 \end{array}$$

So, the money saved by the customer

$$= 10 - \frac{90}{11} = \text{Rs. } \frac{20}{11}$$

- 264.(c)** Let the cost price of horse and cow be x and y respectively
(Ist) Condition: - There is a profit of 10% on the whole cost .

$$\Rightarrow x + y = \frac{10}{11} \times (6200 + 2600)$$

$$x + y = \frac{10}{11} \times 8800 = \text{Rs. } 8000$$

- (IInd) Condition: - There is a profit of $12\frac{1}{2}\%$ on the whole cost .

$$\Rightarrow 6000 + y = \frac{9}{8} \times 8000$$

$$6000 + y = 9000$$

$$y = \text{Rs. } 3000$$

$$\text{and } x = \text{Rs. } 5000$$

- 265.(d)** Let the price of pen and book be x & y respectively. Since there is no loss no profit, so the loss at book must be equal to the profit at pen.

$$\Rightarrow \frac{1}{10}y = \frac{1}{5}x$$

$$\frac{x}{y} = \frac{1}{2} \text{ (or } 2x = y)$$

$$x : y = 1 : 2$$

by second condition.

$$\frac{21}{20}y + \frac{6}{5}x = (x + y + 60)$$

$$\frac{21}{10} \times 2x + \frac{6}{5}x = x + 2x + 60$$

$$\frac{21}{10}x + \frac{6}{5}x = 3x + 60$$

$$\frac{33}{10}x - 3x = 60$$

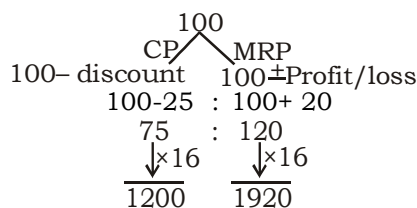
$$\frac{3x}{10} = 60$$

$$\text{price of pen } x = 200$$

$$\text{Price of book } y = 2x = 400$$

- 266. (b)** let the per quintal price of wheat be 100%
then profit earned in first condition.
= $90 \times 8\% + 50 \times 10\% = 720\% + 500\% = 1220\%$
Profit earned in second condition.
= $140 \times 9\% = 1260\%$
But the profit in second condition is 120 rupees more so.
 $1260\% = 1220\% + 120$
 $40\% = 120$
 $1\% = 3$
 $100\% = \text{Rs. } 300$
hence price of wheat per quintal is Rs.300

- 267.(b)** Use the following relation in such type of question .



Hence the marked price of the bicycle is 1920.

- 268. (d)** cost price of first type sugar
= $10 \times \frac{5}{4} = 12.50$ per kg.

$$\text{Cost price of second type sugar} = 15 \times \frac{4}{5}$$

$$= 12 \text{ per kg.}$$

$$\text{cost of 2 kg mixture} = 12.50 + 12$$

$$= 24.5$$

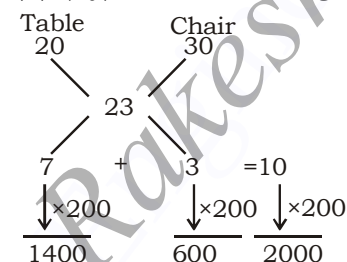
$$\text{selling price of 2 kg mixture}$$

$$= 2 \times 18 = 36$$

$$\text{hence profit percentage}$$

$$= \frac{36 - 24.50}{24.50} \times 100 = 46\frac{46}{49}\%$$

- 269. (c)** (By) mixture and alligation.



Hence cost price of table = 1400 rupees.

- 270.(c)** Total selling price of 4830 copies = $2 \times 4830 = \text{Rs. } 9660$ and total cost price of 4830 copies:
= $\frac{5}{6} \times 9660 = 8050$

Hence the profit earned by the publisher = Rs. 1610

- 271. (b)** In the question while a customer pays for 12 bottles with a 25% discount the producer have to give 13 bottles to the customer.
Hence we can say,

$$13 \times \text{S.P.} = 12 \times \text{M.R.P.} \times \frac{75}{100}$$

$$13 \times \text{S.P.} = 12 \times 113 \times \frac{3}{4}$$

$$\text{S.P.} = \frac{9 \times 113}{13}$$

$$\text{S.P.} = \frac{1017}{13} = \mathbf{78.23}$$

- 272.(b)** Cost price of 12 fruits = Rs. 8
Cost price of 72 fruits = $6 \times 8 = 48$
Since 12 fruits got rotten and remaining 60 fruits were sold.
Selling price of 12 fruits = Rs. 15
Selling price of 60 fruits = $15 \times 5 = \text{Rs. } 75$

$$\text{Profit percentage} = \frac{75 - 48}{48} \times 100$$

$$= \frac{27}{48} \times 100 = \mathbf{56\frac{1}{4}\%}$$

- 273. (a)** Cost price of 1 metre cloth

$$= \frac{20}{25} = \frac{4}{5}$$

Selling price of 1 metre cloth

$$= \frac{25}{20} = \frac{5}{4}$$

$$\text{profit percentage} = \frac{\frac{5}{4} - \frac{4}{5}}{\frac{4}{5}} \times 100$$

$$= \frac{9}{\frac{4}{5}} \times 100 = \frac{9}{16} \times 100 = \mathbf{56\frac{1}{4}\%}$$

- 274.(d)** LCM of 16 and 5 = 80

$$\text{Cost price of 16 pens} = 25$$

$$\text{Cost price of 80 pens} = 125$$

$$\text{Selling price of 5 pens} = 12$$

$$\text{Selling price of 80 pens} = 16 \times 12 = 192$$

So, while he purchases and sells all 80 pens he got a profit = $192 - 125 = \text{Rs. } 67$

So to earn $67 \times 2 = 134$ rupees he must have bought $80 \times 2 = 160$ pens

$$\text{Profit percentage} = \frac{192 - 125}{125} \times 100$$

$$= 67 \times \frac{4}{5} = \mathbf{53\frac{3}{5}\%}$$

- 275.(b)** We known that

$$[\text{Selling price} = \text{Cost price} + \text{Profit}]$$

Profit at selling price

$$= \frac{1 \rightarrow \text{Profit}}{5 \rightarrow \text{S.P.}}$$

$$\text{Profit at cost price} = \frac{1 \rightarrow \text{Profit}}{4 \rightarrow \text{C.P.}}$$

Hence, the selling price = $\frac{5}{4}$ of C.P.

$$\frac{5}{4} \times \text{C.P.} = 600$$

$$\text{C. P.} = \text{Rs. } 480$$

To earn a profit of $\frac{5}{8}$ of cost price,

selling price must be $\frac{13}{8}$ of CP.

$$\text{So, } \frac{13}{8} \times \text{C.P.} = \frac{13}{8} \times 480 = \text{Rs. } 780$$

276.(b) Required Amount

$$= \frac{\left(100 + 6\frac{1}{4}\right)}{(100 - 18)} \times 1230$$

$$= \frac{425}{4 \times 82} \times 1230 = \text{Rs. } 1593.75$$

277.(c) According to question:

$$115\% - 1200 = 95\%$$

$$20\% = 1200$$

$$\text{Cost price (100\%)} = 6000$$

Required price to get a profit of $12\frac{1}{2}\%$

$$= \frac{9}{8} \times 6000 = 6750$$

278.(b) Let the cost price of the articles be Rs 100 and then MRP will be equal to Rs 140

So,

$$\begin{array}{c} 100 \\ \downarrow \\ 140 \\ \swarrow \quad \downarrow \quad \searrow \\ 70 \quad + \quad \frac{35 \times 85}{100} \quad + \quad \frac{35 \times 7}{10} = \frac{497}{4} \end{array}$$

Profit percentage

$$= \frac{\frac{497}{4} - 100}{100} \times 100 = \frac{97}{4}$$

$$= 24\frac{1}{4}\%$$

279.(d) Cost price at which the retailer bought T.V.

$$= 6400 \times \frac{3}{4} \times \frac{17}{20} = 4080$$

$$\text{Hence, } \frac{9}{10} \times \text{new MRP}$$

$$= \frac{6}{5} \times 4080$$

$$\text{New MRP} = \frac{6}{5} \times \frac{10}{9} \times 4080$$

$$= 5440$$

Hence, the new MRP must be 5440 rupees

280.(c) Cost price after first discount

$$= \frac{9}{10} \times 800 = 720$$

$$\text{Cost after second discount} = 612$$

$$\text{Hence second discount}$$

$$= 720 - 612 = 108$$

$$\text{Percentage of second discount}$$

$$= \frac{108}{720} \times 100 = 15\%$$

281.(c) The cost at which the man purchased the freeze

$$= \frac{4}{5} \times \frac{9}{10} \times 15000 = 10800$$

Since man has spend 10% to repair,

So, Required rate to earn a profit of 20%

$$= \frac{6}{5} \times \frac{11}{10} \times 10800 = 14256$$

282.(a) Cost at which the man purchased the watch

$$= \frac{3}{4} \times 5100 = 3825$$

$$\text{Total cost of the watch} = 3825 + 200 = 4025$$

$$\text{Selling price of the watch} = 5100$$

Profit percentage

$$= \frac{5100 - 4025}{4025} \times 100$$

$$= \frac{1075}{4025} \times 100 = 26\frac{114}{161}\%$$

283.(c) Cost of first type of wheat per

$$\text{kg} = 3 \times \frac{5}{4} = \frac{15}{4}$$

Cost of second type of wheat per

$$\text{kg} = \frac{4}{5} \times 5$$

$$\text{Cost of 2 kg mixture} = \frac{15}{4} + 4 = \frac{31}{4}$$

$$\text{Selling price of 2 kg mixture}$$

$$= 2 \times 6 = 12$$

Profit percentage

$$= \frac{12 - \frac{31}{4}}{\frac{31}{4}} \times 100$$

$$= \frac{17}{31} \times 100 = 54\frac{26}{31}\%$$

284.(a) After giving 500 books free the publisher had 1500 copies to sell.

$$\text{But S.P.} = \frac{3}{4} \times 3.25 = \frac{9.75}{4}$$

Since he gives 1 book free after every purchase of 24 books. so,

No. of Books	No. of books for which paid
25	24
↓ × 60	↓ × 60
1500	1440

Total Selling price of 1440 books

$$= 1440 \times \frac{9.75}{4} = 3510$$

Profit percentage

$$= \left(\frac{3510 - 2400}{2400} \right) \times 100 = \frac{1110}{24}$$

$$= 46\frac{1}{4}\%$$

285.(a) Let the C.P. of the articles = x
Then total C.P. of the articles after

$$\text{transportation} = \frac{26}{25}x$$

$$\left[\text{Since } 4\% = \frac{1}{25} \right]$$

Hence by question

$$\left(\frac{26}{25}x \right) \times 7.5\% = 32.5$$

$$\left(\frac{26}{25}x \right) \times \frac{7.5}{100} = 32.5$$

$$x = \frac{32.5 \times 100 \times 25}{26 \times 7.5}$$

$$x = \frac{1250}{3}$$

$$x = 416.66$$

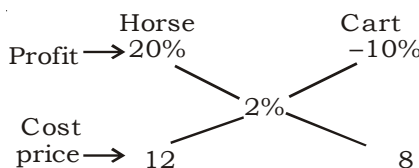
Hence cost price of the articles = 416.66 rupees.

286.(b) See the table.

No. of Books	0 - 2000	2001 - 4000	4001 - 5000
Printing cost 100 Copies	50	25	10

Now it is obvious from the table.
 Printing cost of 2500 copies
 = cost of (2000 + 500)
 = $20 \times 50 + 5 \times 25$
 = Rs. 1125

Similarly printing cost of 4300 copies
 = Cost of (2000 + 2000 + 300)
 = $20 \times 50 + 20 \times 25 + 3 \times 10$
 = $1000 + 500 + 30$
 = **Rs. 1530.**

287.(d) This type of question can be done by mixture and alligation easily-

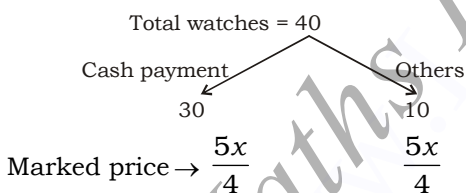
So the ratio of their cost = 12:8
 = 3:2

Since they both were bought for rupees 5000

Hence, the difference of their cost price

$$= \left(\frac{3-2}{5} \right) \times 5000 = \frac{1}{5} \times 5000$$

= **1000.**

288.(a) Let the cost price of watch be x rupees
 Then,

$$\text{Selling price} \rightarrow \left(\frac{5x}{4} \times \frac{9}{10} \right) \quad \left(\frac{5x}{4} \times \frac{19}{20} \right)$$

Now total profit = Total selling price - Total cost price

$$2250 = 30 \times \left(\frac{5x}{4} \times \frac{9}{10} \right) + 10 \times$$

$$\left(\frac{5x}{4} \times \frac{19}{20} \right) - 40x$$

$$2250 = \frac{135x}{4} + \frac{95x}{8} - 40x$$

$$2250 = \frac{45x}{8} \Rightarrow x = \text{Rs. 400}$$

Hence price of each watch is 400 rupees.

289.(c) As we know that.

$$\text{Cost price} = \text{Selling price} - \text{Profit}$$

$$\text{Cost price} = \text{Selling price} + \text{Loss}$$

Ist Conditon:-

$$\text{Profit} = \frac{1}{5} \text{ of the selling price}$$

$$= \frac{1}{4} \text{ of the cost price}$$

$$\left[\because \frac{1 \leftarrow \text{Profit}}{5 \leftarrow \text{Selling}} \Rightarrow \text{C.P.} = 4 \right]$$

$$= 25\%$$

IInd Conditon:-

$$\text{Loss} = \frac{1}{5} \text{ of the selling price}$$

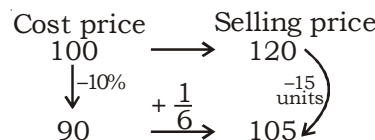
$$= \frac{1}{6} \text{ of the cost price}$$

$$\left[\because \frac{1 \leftarrow \text{Loss}}{5 \leftarrow \text{Selling price}} \Rightarrow \text{C.P.} = 6 \right]$$

$$= 16\frac{2}{3}\%$$

Required difference

$$= \left(25 - 16\frac{2}{3} \right) \% = 8\frac{1}{3} \%$$

290.(b) Let the cost price of the watch is 100 units.

$$\text{But } 15 \text{ units} = \text{Rs. 75}$$

$$1 \text{ units} = \text{Rs. 5}$$

$$\Rightarrow 100 \text{ units} = \text{Rs. 500}$$

So, to earn a prfofit of 40% the

$$\text{selling price of watch} = \frac{7}{5} \times 500$$

$$= \text{Rs. 700.}$$

291.(d) let the profit be x rupees and the loss be y rupees Then by question.

$$1500 - x = 900 + y$$

$$1500 - \frac{1}{3}y = 900 + y$$

$$\left[\because x = \frac{1}{3}y \right]$$

$$\frac{4}{3}y = 600$$

$$y = 450$$

so, the cost price of the fan = 900
 + 450 = 1350

and new selling price of the fan = 1400

Required profit percentage

$$= \frac{1400 - 1350}{1350} \times 100$$

$$= \frac{50}{1350} \times 100 = 3\frac{19}{27} \%$$

292.(b) Note : In such type of question try to solve on quantity rather on cost price to avoid lengthy calculations.

Let he sold the remaining quantity making $x\%$ profit then total profit is given by.

$$20 \times 10\% - 25 \times 10\% + 15 \times x\% = 60 \times 25\% - 50\% + 15 \times x\% = 1500\%$$

$$15 \times x\% = 1550\%$$

$$x\% = \frac{310}{3} \%$$

Hence, the trader must sold the re-

maining quantity at $\frac{310}{3} \%$ profit.

so, the selling price of the remain-
 ing quantity

$$= 100\% + \frac{310}{3} \% = \frac{610}{3} \%$$

$$= \frac{610 \times 800}{3 \times 100} = \frac{4880}{3}$$

$$\Rightarrow \text{Rs. } 1626\frac{2}{3}$$

Hence, he must sell it at Rs. 1626

$$\frac{2}{3} \text{ rupees per quintal.}$$

293.(a) Note: As in the previous question we will solve the question at quantity.

Let he must sell the remaining quantity at $x\%$ profit then the total profit is given by.

$$\frac{2}{3} \times (-10\%) + \frac{2}{3} \times x\% = 1 \times 20\%$$

$$\frac{-10}{3}\% + \frac{2}{3}x\% = 20\%$$

$$\frac{2}{3}x\% = \frac{70}{3}\%$$

$$x\% = 35\%$$

Hence, the remaining quantity must be sold at 35% profit.

Alternatively: This question can be solved by mixture and alligation.

$$\begin{array}{ccc} -10\% & & 35\% / 5\% \\ & \searrow \quad \swarrow & \\ & 20 & \end{array}$$

15 : 30
1 : 2
So, he must sell the remaining quantity at 35% profit.

294.(c)

$$\begin{array}{ccc} & 100 & \\ \text{Cost price} \swarrow & & \searrow \text{MRP} \\ 100 - \text{discount} & & 100 \pm \text{Profit / Loss} \\ 100 - 10 & : & 100 + 20 \\ 90 & : & 120 \\ \downarrow \times 10 & & \downarrow \times 10 \\ 900 & & \text{RS. 1200} \end{array}$$

Hence, the marked price = Rs. **1200**.

295.(b) Cost of 12 eggs = Rs. 24
Cost of 1 egg = Rs. 2
Cost of 80 eggs = Rs. 160
Total cost of 80 eggs = 160 + 16 = Rs. 176.

Selling price of 70 eggs = 70 × 3.20 = Rs. 224

Profit percentage =

$$\frac{224 - 176}{176} \times 100$$

$$= \frac{48}{176} \times 100 = \frac{300}{11} = 27\frac{3}{11}\%$$

296.(c) Let the marked price of the article = x rupees.

Then selling price of the article = $\frac{3}{4}x$

Also the cost price of the article

$$= \frac{5}{6} \times \left(\frac{3}{4}x\right)$$

Now, Profit is given by -

$$\frac{3}{4}x - \frac{5}{6} \times \frac{3}{4}x = 1801$$

$$\frac{3}{4}x - \frac{5}{8}x = 1801$$

$$\frac{1}{8}x = 1801$$

$$x = 14408$$

Hence the marked price of the article = 14408 rupees.

Alternate:

CP	SP	MP
100	120	160

+20%

$$\text{MP} = 120 \times \frac{100}{75} = 160$$

$$20 \text{ units} = 1801$$

$$1 \text{ unit} = 1801 \div 20$$

$$\text{MP (160 units)} = \frac{1801}{20} \times 160$$

$$= \text{Rs. 14408}$$

297.(b) Let the cost price be 100 units.

Then,

Initial Price	Total Price	Selling Price
100	110	121 units

Now, since he given a discounts of 10% so let the marked price be x.

$$\text{Then, } \frac{9}{10} \times x = 121$$

$$x = \frac{1210}{9}$$

$$x = 134\frac{4}{9} \text{ units}$$

So, the required percentage

$$= \frac{134\frac{4}{9} - 100}{100} \times 100$$

$$= 34\frac{4}{9}\%$$

298.(b) Let the marked price be x rupees.

Then,

Cost Price	Total Price	Selling Price
5000	5750	6900

$$\text{By question, } \frac{3}{4} \times x = 6900$$

$$x = \frac{4}{3} \times 6900 = 9200$$

Hence the marked price of each T.V. = 9200 rupees.

299.(d) Let the cost price of the book be x rupees.

$$\text{Then, } x \times \frac{(100 + x)}{100} = 96$$

$$\Rightarrow x^2 + 100x = 9600$$

$$\Rightarrow x^2 + 100x - 9600 = 0$$

$$\Rightarrow x^2 + 160 - 60x - 9600 = 0$$

$$\Rightarrow (x - 60)(x + 160) = 0$$

$$\Rightarrow x = 60 \text{ or } x = -160$$

Hence the cost price of the book = **60 rupees**

Alternatively:-

This type of question can be handle just simply going through option -

Taking Option (d)

The cost price = 60

Profit percentage = 60%

$$\text{Selling Price} = 60 \times \frac{160}{100} = \mathbf{96}$$

Hence option (d) is correct answer.

300.(c)

	No. of fruits	Cost
I st type	12 ₁	20 ₁
II nd type	12 ₃	15 ₃
Total	12 + 36 = 48	20 + 45 = 65

But the selling price of 48 fruits = 4 × 12 = 48

Hence his loss percentage

$$= \frac{65 - 48}{65} \times 100$$

$$= \frac{17}{65} \times 100 = 26\frac{2}{13}\%$$

301.(b) Total cost of all radios = 20 × 1200 + 10 × 25 + 150 = 24000 + 250 + 150 = 24400

$$\text{So, final cost per radio} = \frac{24400}{20}$$

$$= 1220$$

Selling price of the whole seller =

$$\frac{6}{5} \times 1220 = 1464$$

Selling price of the retailer to his customers

$$= \frac{5}{4} \times 1464$$

$$\Rightarrow \mathbf{1830 \text{ rupees}}$$

Hence required rate per radio = 1830 rupees

Alternatively:-

To make one line approach
The price per radio required

$$= \frac{1}{20} \times \frac{5}{4} \times \frac{6}{5} [24000 + 400]$$

$$= \frac{1}{20} \times \frac{30}{20} \times 24400$$

$$= 30 \times 61 = 1830 \text{ rupees}$$

302.(d) Actual cost price per kg of the mixture

$$= \frac{10}{9} \times 20 = 22 \frac{2}{9}$$

By mixture and alligation rule,

I st Type		II nd Type
16		28
	22 $\frac{2}{9}$	
5 $\frac{7}{9}$		6 $\frac{2}{9}$
52	:	56
13	:	14

Hence he mixed the two typed in the ratio 13 : 14

303.(c) Total cost of all type writers
= 20 × 3500 + 20 × 350 = 70,000 + 7,000 = 77000

Selling price of all the type writer

$$= \frac{5}{4} \times 77000 = 96250$$

Hence the 90% of the marked price = Selling price

$$90\% \text{ of MRP} = 96250$$

$$10\% \text{ of MRP} = \frac{1}{9} \times 96250$$

Discount allowed = 10694.44 ≈ 10695 (approx)

304.(c) Let the profit and loss be x and y respectively.

Then cost of the watch is given by -
3000 - x = 2400 + y

$$\left\{ \begin{array}{l} x = \frac{2}{3}y \\ \Rightarrow \frac{3}{2}x = y \end{array} \right\}$$

$$3000 - x = 2400 + \frac{3}{2}x$$

$$\Rightarrow \frac{5}{2}x = 600$$

Profit x = 240
and the cost of the watch = 3000 - 240 = 2760

So, the required profit percent-

$$\text{age} = \frac{240}{2760} \times 100$$

$$= \frac{200}{23} = 8 \frac{16}{23} \%$$

305.(d) Let the initial cost price of the radio be 100 units.

Cost Price		Selling Price
100	$\xrightarrow{-8\%}$	92
90	$\xrightarrow{+20\%}$	108

So, 16 units = Rs. 5120

$$100 \text{ units} = \frac{100}{16} \times 5120$$

Hence, cost price of the radio = 32,000

306.(b) when selling price of two articles be same solve the question by the following method :-

	(100)	
I st		II nd
100+30		100-30
C.P. → 70		130 = 200
	$\downarrow +30\%$	$\downarrow -30\%$
S.P. → 91		91 = 182

Loss percentage

$$= \frac{200 - 182}{200} \times 100 = 9\%$$

Hence, We can say
91% of the cost price of the both = Selling price of both.

$$91\% \text{ of C.P.} = 2 \text{ K}$$

$$9\% \text{ of C.P.} = \frac{2\text{K}}{91} \times 9$$

$$\text{Hence, Loss incurred} = \frac{18}{91} \text{ K}$$

Alternatively:

In such type of question there is always a loss. and the loss

$$\text{percentage is given by} = \frac{30 \times 30}{100}$$

$$= 9\% \text{ (loss)}$$

To find the amount of loss :-
91% of C.P. of both articles = S.P. of both article

$$91\% \text{ of C.P.} = 2 \text{ K}$$

$$9\% \text{ of C.P.} = \frac{2\text{K}}{91} \times 9 = \frac{18}{91} \text{ K}$$

307.(b) This can be solved by mixture and alligation:-

Radio		Watch
-10%		15%
15	0	10
3	:	2

Hence, The ratio of Cost Price of radio and watch

$$= 3 : 2$$

Difference of Cost Price =

$$\frac{1}{5} \times 6000 = 1200$$

308.(c) Since the selling price of both the article is same so.

	(100)	
I st		II nd
100+30		100-20
C.P. → 80		130
	$\downarrow \times 200$	$\downarrow \times 200$
1600		2600 = 4200
	$\downarrow +30\%$	$\downarrow -20\%$
S.P. → 2080		2080 = 4160

Now, Since Ist article is sold for 3000 and second on the same.

So the new selling price of two articles

$$= 3000 + 1911 = 4911$$

And cost price of both articles = 4200

So, Profit percentage

$$= \frac{4911 - 4200}{4200} \times 100$$

$$= \frac{711}{42} \Rightarrow \frac{237}{14} \Rightarrow 16 \frac{13}{14} \%$$

309. (c)

	No. of fruits	Cost
I st type	12 →	25
	or 60 →	125
II nd type	20 →	32
	or 60 →	96
	Cost price →	120 125 + 96 = 221
	Selling price →	20 40 +19
	or 120	240

Hence, he has made a profit of 19 rupees on buying 120 fruits.

Rupees		No. of fruit bought
19	→	120
$\downarrow \times 40$		$\downarrow \times 40$
760		4800

319.(c) Let the price of the article in Delhi be x rupees. Then cost of the article in Patna = $\frac{9}{10}x$

By question:-

$$\text{Selling price} = \frac{9x}{10} + 300 = x - 480$$

$$\Rightarrow \frac{x}{10} = 780$$

$$\Rightarrow x = 7800$$

$$\text{So, cost of article in Patna} = \frac{9}{10}x$$

$$\Rightarrow \frac{9}{10} \times 7800 \Rightarrow 7020 \text{ rupees}$$

320.(a) The cost price of $(4+3+5 = 12)$ kg tea
 $= 4 \times 15 + 3 \times 20 + 5 \times 30$
 $= 60 + 60 + 150 = 270$
 Selling price of 12 kg tea
 $= 12 \times 25 = 300$
 Profit percentage
 $= \frac{300 - 270}{270} \times 100$
 $= \frac{30}{270} \times 100 = 11\frac{1}{9}\%$

321. (b) Total cost of the paper
 $= 240 \times 3200 + 1080$
 $+ \frac{80 \times 240}{100} + 200$
 $= 769472$
 total marked price of all books
 $= \frac{7}{5} \times 769472$
 Marked price of one book
 $= \frac{1}{2400} \times \frac{7}{5} \times 769472$
 $= \text{Rs. } 448.84 = \text{Rs. } 449(\text{approx})$

322.(d) Total cost in making cream and tond milk
 $= 12 \times 40 + 20 = 480 + 20 = 500$
 Total selling price of 8 kg. cream and 36 ltr tond milk
 $= 8 \times 60 + 36 \times 6 = 480 + 216 = 696$

$$\text{Profit percentage} = \frac{196}{500} \times 100$$

$$= 39.20\%$$

323.(c)

I 400 ↓ -20%	II 500 ↓ -10%	III 300 ↓ +12½%
--------------------	---------------------	-----------------------

$$\text{Profit/Loss} \rightarrow -80 + 50 + 37\frac{1}{2}$$

$$= 7\frac{1}{2}$$

$$\text{Profit percentage} = \frac{7\frac{1}{2}}{1200} \times 100$$

$$= \frac{15}{2 \times 12} = \frac{15}{24} = \frac{5}{8} = .625\%$$

324.(b) Profit per item = $90 - 60 = 30$ rupees.
 Total profit to be earned
 $= 3000 + 6000$
 $= 9000$ per week
 Number of articles to be produced per week
 $= \frac{9000}{30} = 300$

325.(a) profit = $90 \times 30 + 120 \times 20 - 30 \times 30 = 4200$

326.(b) Coming to one line approach the required sell in g price of the watch =
 $\frac{154}{100} \times \left[\frac{5}{7} \times \left(\frac{5}{4} \times 960 \right) \right] = \text{Rs. } 1320$

327.(b) Let the marked price of the radio be x rupees
 Then $x - 100 = \frac{5}{4} \times 1600$

$$x - 100 = 2000$$

$$x = 2100$$

So selling the radio at marked price the profit percentage

$$= \frac{2100 - 1600}{1600} \times 100 = \frac{500}{16}$$

$$= 31\frac{1}{4}\%$$

328.(a) Let the production cost of iron be x then by question.

$$x \times \frac{3}{2} \times \frac{6}{5} \times \frac{23}{20} = 207$$

$$\Rightarrow x = 100$$

Hence production cost = 100 and local production cost tax

$$= \frac{30}{100} \times 100 = 30$$

329.(a) Required rate = $600 \times$

$$\frac{4}{5} \times \frac{9}{10} \times \frac{11}{10} \times \frac{23}{20}$$

$$= \text{Rs. } 546.48$$

330. (c) Total expenses = 35% of $3750 + 386 + 940 + 136 + 200 + 1\% \text{ of } 3750 = 3012$
 Then profit = $3750 - 3012 = \text{Rs. } 738$

$$\text{New annual sale} = 3750 \times \frac{140}{100}$$

$$= \text{Rs. } 5250$$

$$\text{New expenses} = 35\% \text{ of } 5250 + 386 + 2 \times 940 + 136 + 200 + 1\% \text{ of } 5250 = \text{Rs. } 4492.$$

$$\therefore \text{New profit} = 5250 - 4492 = \text{Rs. } 758$$

$$\text{Increase in profit} = (758 - 738) = \text{Rs. } 20.$$

$$\text{331.(b)} \quad 17\frac{1}{2}\% = \frac{35}{2}\% = \frac{7}{40}$$

Let the cost of the commodity of first trader be x

$$\text{then } \frac{47}{40}x = 3760$$

Profit earned by first trader

$$= \frac{7}{40}x = \frac{7}{47} \times 3760$$

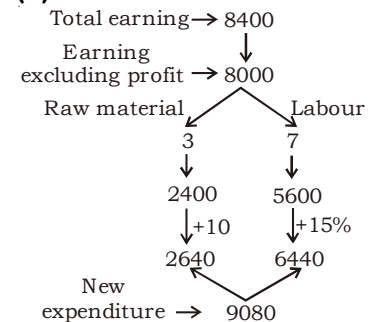
$$= 560$$

and profit earned by second trader

$$= \frac{7}{40} \times 3760 = 658$$

Difference of actual profit earned by them = $658 - 560 = \text{Rs. } 98$

332.(d)



Now the total cost = 9080 and total earning = 8400 so loss percentage

$$= \frac{9080 - 8400}{9080} \times 100 = 7.48\%$$

333.(b) Let the cost price of the article be $100x$ units

Then by question

$$110x - 95x = \text{Rs. } 75$$

$$15x = \text{Rs. } 75$$

$$x = \text{Rs. } 5$$

$$100x = \text{Rs. } 500$$

Hence the cost price of the article is Rs. 500

- 334.(d)** In such type of transaction there is always loss to the seller and the loss is given by

$$= \left(\frac{x^2}{100} \right) \therefore (\text{Where } x \text{ is profit/loss}$$

percentage)

Hence the loss percentage

$$= \frac{15 \times 15}{100} \% = 2.25 \% (\text{loss})$$

- 335.(a)** C.P of 15 = S.P of 12

$$\text{profit percentage} = \left(\frac{15-12}{12} \right) \times 100$$

$$= \frac{3}{12} \times 100 = 25\%$$

Note : While calculating profit/loss on the number of article, we calculate on SP

- 336.(b)**

$$\begin{array}{l} \text{NO of Bananas} \quad \text{Rupees} \\ \text{Buying} \left\{ \begin{array}{l} 2 \times \left(\begin{array}{l} 6 \longrightarrow 15 \\ 12 \longrightarrow 30 \end{array} \right) \times 2 \end{array} \right\} \end{array}$$

$$\text{Selling} \left\{ \begin{array}{l} 3 \times \left(\begin{array}{l} 4 \longrightarrow 12 \\ 12 \longrightarrow 36 \end{array} \right) \times 3 \end{array} \right\}$$

Hence profit percentage

$$= \frac{36-30}{30} \times 100$$

$$= \frac{6}{30} \times 100 = 20\%$$

- 337.(a)** Let the cost price of the article be 100 units

Then

cost price market price selling price

$$100 \xrightarrow{+20\%} 120 \xrightarrow{-10\%} 108$$

Hence profit percentage

$$= \left(\frac{108-100}{100} \right) \times 100 = 8\%$$

- 338.(c)** Let the cost of an article be 100 units

Then

$$100 \xrightarrow{-20\%} 80 \xrightarrow{-10\%} 72 \xrightarrow{-5\%} 68.40$$

$$\text{Hence total discount} = 100 - 68.40 = 31.60$$

$$\text{Discount percentage} = \frac{31.60}{100} \times 100$$

$$= 31.60\%$$

Alternatively : (i)

single equivalent discount of two successive discount of 20% and 10%

$$= \left(20 + 10 - \frac{20 \times 10}{100} \right) \% = 28\%$$

now single discount of two successive discount of 28% and 5%

$$= \left(28 + 5 - \frac{28 \times 5}{100} \right) \% = 31.60\%$$

Alternatively (ii)

single equivalent discount of three successive discount of a%, b% and c% is given by discount

$$= \left[a + b + c - \left(\frac{ab + bc + ca}{100} \right) + \frac{abc}{(100)^2} \right]$$

Hence Required discount % =

$$\left[20 + 10 + 5 - \left(\frac{20 \times 10 + 10 \times 5 + 5 \times 20}{100} \right) + \frac{20 \times 10 \times 5}{(100)^2} \right] = 31.6\%$$

- 339. (c)**

$$\begin{array}{ccc} \text{Cost price} & \text{After 1st discount} & \text{After 2nd discount} \\ 600 & \xrightarrow{-120} 480 & \xrightarrow{\times \frac{10}{9}} 432 \end{array}$$

Hence the first discount percentage

$$= \frac{120}{600} \times 100 = 20\%$$

Alternatively:

Let the first discount be x%

Total discount %

$$= \frac{600-432}{600} \times 100$$

$$= \frac{168}{600} \times 100 = 28\%$$

Then 28%

$$= \left(x + 10 - \frac{x \times 10}{100} \right) \%$$

$$\frac{90}{100} x = 18$$

$$\Rightarrow x\% = 20\%$$

- 340. (c)** cost price of the book

$$= \frac{10}{11} \times 891 = \text{Rs. } 810$$

- 341.(a)** Let number of pencils Vinod had = N

Then selling price of pencils selling at 2.50 per pencil = 2.50 N

and the selling price of pencils selling at Rs. 1.75 per pencil

$$= 1.75 N$$

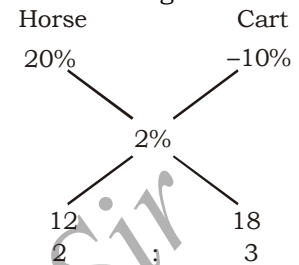
$$\text{cost price} = 2.50 N - 110 = 1.75$$

$$N + 55$$

$$\Rightarrow .75N = 165$$

$$N = \frac{165}{.75} = 220$$

- 342.(c)** This question can be sold by mixture and alligation



Hence cost price of the horse

$$= \frac{2}{(2+3)} \times 20,000 = 8,000$$

- 343.(a)** Let A bought the article for x rupees

Then

$$x \times \frac{23}{20} \times \frac{9}{10} = 517.50$$

$$x = \frac{517.50 \times 20 \times 10}{23 \times 9} = \text{Rs. } 500$$

- 344.(c)** Let the fixed price be 300 units

Then

$$\begin{array}{ccc} \text{Fixed price} & \text{Selling price} & \text{Cost price} \\ 300 & \xrightarrow{\times \frac{2}{3}} 200 & \xrightarrow{\times \frac{10}{9}} \frac{2000}{9} \end{array}$$

Hence the profit percentage

$$= \frac{300 - \frac{2000}{9}}{\frac{2000}{9}} \times 100$$

$$= \frac{700}{2000} \times 100 = \frac{70}{2} = 35\%$$

- 345.(a)** C.P of 1000 gms = S.P of 950 gms

Profit percentage

$$= \frac{1000-950}{950} \times 100$$

$$= \frac{50}{950} \times 100 = \frac{1}{19} \times 100 = 5 \frac{5}{19} \%$$

- 346. (a)** cost price of 144 eggs = 144 × 1 = Rs. 144

selling price of (144 - 20 = 124) eggs = 124 × 1.20

$$= \text{Rs. } 148.80$$

Hence the profit percentage

$$= \frac{148.80-144}{144} \times 100$$

$$= \frac{4.80}{144} \times 100 = 3 \frac{1}{3} \%$$

347.(d) $39 \text{ S.P} - 39 \text{ C.P} = 13 \text{ S.P}$

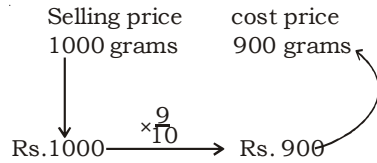
$26 \text{ S.P} = 39 \text{ C.P}$

Hence profit percentage

$$= \frac{39-26}{26} \times 100 = \frac{13}{26} \times 100 = 50\%$$

[Note : when the profit or loss is calculated over the number of articles we calculate it an selling price.

348. (d) Let the cost of 1 gram = Rs. 1



Hence he weighs 900 grams instead of 1 kg

349.(c) Let the loss be x rupees when it is sold at Rs. 600

so, cost price = $600 + x = 900 - 2x$

$3x = 300$
 $x = 100$

cost price = $600 + 100 = \text{Rs. } 700$

350.(d) Given That

$$\left(2\frac{1}{2} + 7\frac{1}{2}\right)\% = \text{Rs. } 100$$

$10\% = \text{Rs. } 100$

cost of the chair $100\% = \text{Rs. } 1000$

Required selling price = $112\frac{1}{2}\%$

$= 112.5\% = \text{Rs. } 1125$

351.(d) Condition (i)

Total profit on the whole transaction

$$= \frac{1}{2} \times 20\% + \frac{1}{2} \times 40\% = 30\%$$

condition (ii)

Total profit on the whole transaction = 25%

But by the question

$30\% - 25\% = \text{Rs. } 100$

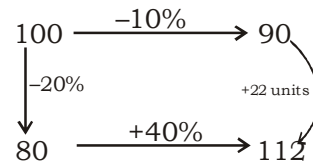
$5\% = \text{Rs. } 100$

Total cost of all article $100\% = \text{Rs } 2000$

cost of one article = $\frac{2000}{100} = \text{Rs. } 20$

352.(c) Let the cost price of the article be 100 units

cost price selling price



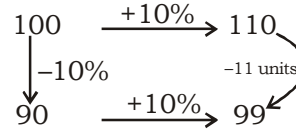
By question 22 units = Rs 55

100 units = $\frac{100}{22} \times 55$

Hence the cost price of the article = Rs. 250

353.(b) Let the cost price of the electric iron = 100 units

cost price selling price



Now by question

11 units = Rs. 16.50

100 units = $\frac{100}{11} \times 16.50$

cost price = **Rs. 150**

354.(b) Let the marked price be x rupees

Then

$$x \times \frac{19}{20} = 95 \times \frac{11}{10}$$

$x = \text{Rs. } 110$

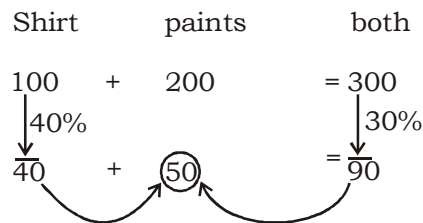
355.(b) Total cost of t.v set = $11250 + 150 + 800 = 12200$

Required selling price

$$= \frac{23}{20} \times 12200$$

$= \text{Rs. } 14030$

356.(c)



so the discount percentage on the paints

$$= \frac{50}{200} \times 100$$

$= 25\%$

357.(a) cost price of the article

$$= \frac{5}{6} \times 312 = 260$$

selling price of the article = $312 - 31.20$

$= 280.8$

Profit percentage

$$= \left(\frac{280.80 - 260}{260} \right) \times 100$$

$$= \frac{20.80}{260} \times 100 = 8\%$$

Alternatively:

discount allowed = $\frac{31.20}{312} \times 100$

$= 10\%$

Hence profit percentage

$$= \left(20 - 10 - \frac{20 \times 100}{100} \right) \%$$

$= (10 - 2)\% = 8\%$

358. (b) Total cost of all calculators

$= 150 \times 250 + 2500 = 40,000$

Selling price of all calculators

$$= \frac{19}{20} \times (150 \times 320) = 45600$$

Profit percentage

$$= \left(\frac{45600 - 40,000}{40,000} \right) \times 100$$

$$= \left(\frac{5600}{40,000} \right) \times 100 = 14\%$$

359.(d) Let the market price of the t.v. be $x\%$ above the cost price than

$$19.6\% = x\% - 8\% - \frac{8 \times x}{100} \%$$

$$27.6 = \frac{92x}{100}$$

$$x = \frac{27.6 \times 100}{92}$$

$x\% = 30\%$

Since there is no discount so he would earn 30% on the cost price of the t.v set

Alternatively:

cost price	:	marked price
100-8	:	100+19.6
92	:	119.6

$$\text{profit}\% = \frac{27.6}{92} \times 100 = 30\%$$

360.(b) selling price of the watch =

$$\frac{6}{5} \times 960 = 1152$$

20% of the selling price

$$= \frac{1}{5} \times 1152 = 230.40$$

Hence the selling price at which the new customer bought = 960 + 230.40 = Rs. 1190.40

361.(c) Let the fixed price be 100 units

Fixed price	Buying price	Marked price	Selling price
100	$\times \frac{3}{4}$	75	$\rightarrow 140 - 20\% \rightarrow 112$

Hence the profit percentage

$$= \left(\frac{112 - 75}{75} \right) \times 100$$

$$= \frac{37}{75} \times 100 = 49 \frac{1}{3} \%$$

362.(d) Let the total article be 100 and each costing Rs. 1

	3/5	100	2/5
No. of articles	60		40
Selling price	60		$40 \times \frac{16}{10} \times \frac{4}{5}$

$$= 51.2$$

$$\text{Total selling price} = 60 + 51.20 = 111.20$$

Profit percentage

$$= \left(\frac{111.20 - 100}{100} \right) \times 100$$

$$= 11.20 \%$$

363.(b) First option :

$$\text{single equivalent discount} = 30 + 10 + 10 -$$

$$\frac{(30 \times 10 + 10 \times 10 + 30 \times 10)}{100} +$$

$$\frac{30 \times 10 \times 10}{(100)^2} = 50 - 7 + 0.3 = 43.3 \%$$

second option :

$$\text{single equivalent discount} = 40 + 5 + 5 -$$

$$\frac{(40 \times 5 + 5 \times 5 + 5 \times 40)}{100} +$$

$$\frac{40 \times 5 \times 5}{(100)^2} = 50 - 4.25 + 0.10 = 45.85 \%$$

Hence second option is better where he can save 45.85 - 43.3 = 2.55%

Money saved by him

$$= 5000 \times \frac{2.55}{100} = \text{Rs. } 127.50$$

364. (d) Let I bought 20x oranges.

cost of 4 oranges = Rs. 1

cost of 20x oranges

$$= \text{Rs. } \frac{20x}{4} \times 1 = 5x$$

Since I kept $\frac{1}{5}$ of the

oranges.

so, remaining oranges to sell

$$= \frac{4}{5} \times 20x = 16x$$

selling price of 3 oranges

= Rs. 1

selling price of 16x oranges

$$= \text{Rs. } \frac{16x}{3} \times 1$$

$$\text{But } \frac{16x}{3} - 5x = 1 \text{ (Given)}$$

$$\frac{x}{3} = 1$$

$$x = 3$$

Hence I bought 20x = 20 × 3 = 60 oranges

365.(b) Let the price of cheaper shirt is x rupees.

	Cheaper	Dearer	Total
cost	x	x + 100	= 2x + 100
S.P	$\frac{9x}{10}$	$\frac{11}{10}(x+100)$	= 2x + 110

Hence profit earned

$$= (2x + 110) - (2x + 100) = \text{Rs. } 10$$

366.(b) Since MRP of the watch is 100%

Then the single equivalent discount

$$= 30 + 10 - \frac{30 \times 10}{100} = 37 \%$$

So the bought it in 100 - 37

= 63%

Now

$$37 \% \rightarrow 444$$

cost at which he bought 63%

$$\rightarrow \frac{63}{37} \times 444 = \text{Rs. } 756$$

Required cost to earn 40% profit

$$= \frac{14}{10} \times 756$$

$$= 1058.4$$

367.(b) Profit or loss percentage

$$= 5 \times \frac{1}{3} + 7 \times \frac{1}{5} + \left[1 - \left(\frac{1}{5} + \frac{1}{3} \right) \right] \times (-$$

$$10) = \left[\frac{5}{3} + \frac{7}{5} - 10 \times \left(\frac{7}{15} \right) \right] \%$$

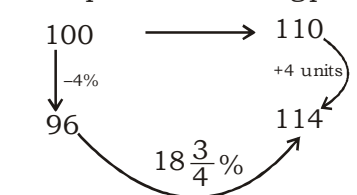
$$\left(\frac{25 + 21 - 70}{15} \right)$$

$$= -\frac{24}{15} = -1 \frac{3}{5} \%$$
 (loss)

$$= -1.6 \%$$
 (loss)

368. (d) Let the price of book be 100 units

Cost price selling price



4 units = 60 paise

$$100 \text{ units} = \frac{100}{4} \times 60 \text{ paise}$$

$$= 1500 \text{ paise}$$

$$= 15 \text{ rupees}$$

369.(c) Let the cost price of an article be 100 units.

and let the marked price of an article be x units

cost of 16 articles = 16 × 100

Selling price of 15 articles

$$= 16 \times 100 \times \frac{135}{100}$$

[Since 1 article is free with 15 article]

Marked price of 15 articles

$$= 15 \times x$$

Selling price of 15 articles

$$= 15 \times x \times \frac{96}{100}$$

Now by question

$$15 \times x \times \frac{96}{100}$$

$$= 16 \times 100 \times \frac{135}{100}$$

Marked price x = 150. units

Hence the required percentage

$$= \left(\frac{150 - 100}{100} \right) \times 100 = 50\%$$

Alternate:

$$\begin{array}{lcl} \text{CP} & : & \text{MP} \\ (100 - d\%) & : & (100 + P\%) \\ 96 & : & 135 \end{array}$$

CP is for 16 articles and MP is for 15 articles

$$\begin{array}{lcl} \text{CP} & : & \text{MP} \\ \frac{96}{16} & : & \frac{135}{15} \\ 6 & : & 9 \end{array}$$

$$\text{Required}\% = \frac{9 - 6}{6} \times 100 = 50\%$$

370.(c) Let the profit be x rupeesThen the loss = $x - 25$

So, Now by question

$$1400 - x = 1025 + x - 25$$

$$2x = 400$$

$$x = 200$$

Hence the cost price of the radio

$$= 1400 - 200 = 1200$$

371.(b) Let the cost price of the photo be x rupees

Then the selling price of the

$$\text{photo} = x + \frac{1}{5}x$$

$$\frac{6}{5}x = 48$$

cost price x = Rs. 40

New selling price = Rs. 38

Loss percentage

$$= \left(\frac{40 - 38}{40} \right) \times 100$$

$$= \frac{2}{40} \times 100 = 5\% \text{ (loss)}$$

372.(c)

	Number of Lemons	rupees
1st type	5	$\rightarrow 4 \times 8$
2nd type	8	$\rightarrow 1 \times 5$
Total	40+40=80	$\rightarrow 8 \times 5 = 13$

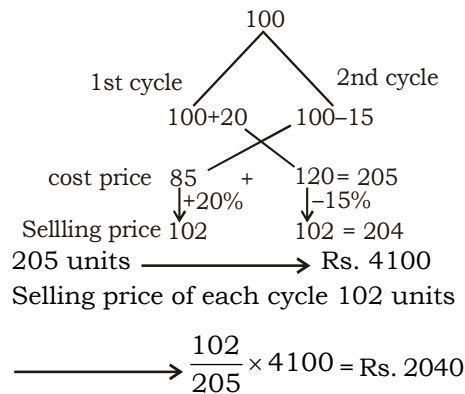
Cost of 80 lemons = Rs. 13

$$\text{Cost of 12 lemons} = \frac{12 \times 13}{80}$$

Required selling price of 12 lemons

$$= \frac{6}{5} \times \frac{12}{80} \times 13$$

$$= \text{Rs. } 3.12$$

373.(b)**374.(b)** Let Ram bought the watch in $100x$ rupees

$$\text{Ram} \quad \text{Shyam} \quad \text{Mohan} \quad \text{Morari}$$

$$100x + \frac{10x}{100} + 110x + \frac{120}{100} + 110x + 120 + \frac{10x}{100} + (110x + 120) + \frac{10x}{100}$$

By question

$$110x + 120 + 10x = 1080$$

$$120x + 120 = 1080$$

$$120x = 960$$

$$x = 8.$$

Hence Ram bought the watch in

$$100 \times 8 = 800$$

375.(d) Selling price of Sangita

$$= \frac{4}{5} \times 5 \text{ lakh} = 4 \text{ lakh}$$

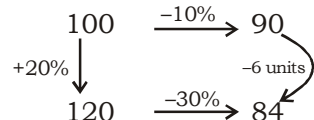
$$\text{Selling price of Geeta} = \frac{6}{5} \times 4 \text{ lakh}$$

$$= 4.8 \text{ lakh}$$

Since Sangita sold the flat for 4 lakh and bought it again in 4.8 lakh

Hence there is loss to Sangita = $(4.8 - 4)$ lakh = Rs. 80,000**376.(c)** let the cost of the cow be 100 units

Cost price Selling price

But 6 units $\rightarrow$ Rs. 426

$$\times 426 = 7100$$

Hence the required selling price = $7100 + 240 = 7340$

377.(b) Let the profit be x on selling it for Rs. 80

$$\text{cost price} = 80 - x = 96 - 3x$$

$$2x = 16$$

$$x = 8$$

cost price = $80 - 8 = \text{Rs. } 72$

Required profit percentage

$$= \frac{8}{72} \times 100 = 11.11\%$$

$$= \frac{8}{72} \times 100 = 11.11\%$$

378.(a) let the fixed price be 100 units

and we know that $16 \times 100 = 1600$

Let the cost Price of the item be x unit

$$\text{Then } x \times x = 1600 \times 100$$

$$x = \sqrt{160000} = 400$$

$$x = 90 \text{ units}$$

New selling price =

$$= 120 \text{ units}$$

Required profit percentage

$$= \frac{120 - 90}{90} \times 100 = 33.33\%$$

379.(a) Percentage profit earned

$$= \frac{120 - 90}{90} \times 100 = 33.33\%$$

$$= \frac{120 - 90}{90} \times 100 = 33.33\%$$

$$= 12\% - 2\% = 10\%$$

$$\text{But } 10\% = 45$$

$$100\% = \text{Rs. } 450$$

Hence the cost price of the stock = Rs. 450

380.(a) This can be solved by mixture and alligation

$$\begin{array}{l} \text{Cost price} \\ \text{Selling price} \end{array}$$

Hence the cost of watch = Rs 510

381.(d) Let the loss be x rupees Than the profit

$$= \frac{x}{510 - x} \times 100$$

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$$\text{cost price} = 1135 - \frac{9}{8}x$$

$$= 880 + x$$

$$\frac{17}{8}x = 255$$

$$x = 120$$

$$\text{cost price of the shirt} = 880 + 120$$

$$= 1000$$

Required profit earned

$$= \frac{12}{100} \times 1000 = \text{Rs. 120}$$

382. (a) Total profit or loss percentage

$$= \frac{2}{5} \times (-5\%) + \frac{3}{5} \times 15\%$$

$$= -2\% + 9\%$$

$$= +7\% (+$$

ve sign shows profit)

Hence

profit percentage

$$= 7\%$$

383. (d) Single equivalent discount from the shopkeeper

$$= 20 + 10 + 5 -$$

$$\left(\frac{20 \times 10 + 10 \times 5 + 5 \times 20}{100} \right) +$$

$$\frac{20 \times 10 \times 5}{(100)^2}$$

$$= 35 - \left(\frac{350}{100} \right) + \frac{1000}{(100)^2}$$

$$= 35 - 3.50 + 0.10 = 35 - 3.40$$

$$= 31.60\%$$

So, the selling price from the shopkeeper A

$$= 68.40\%$$

Single equivalent discount from the shopkeeper B

$$= 19 + 8 + 8 - \left(\frac{19 \times 8 + 8 \times 8 + 19}{100} \right) +$$

$$\frac{19 \times 8 \times 8}{(100)^2} = 35 - 3.68 + 1.216 = 31.4416\%$$

So, the selling price from the shopkeeper B

$$= 68.5584\%$$

$$\text{Required saving} = 68.5584 - 68.40 = 0.1584\%$$

$$= \frac{.01584}{100} \times 48000$$

$$= \text{Rs. 76.032} = \text{Rs 76}$$

384. (b) Since he distributed 300 copies free and remaining copies = 900

Total copy Copy whose cost is counted

$$\begin{array}{r} 20 \\ \downarrow \times 45 \\ \hline 900 \end{array}$$

$$\begin{array}{r} 18 \\ \downarrow \times 45 \\ \hline 810 \end{array}$$

Now let the selling price of a book is x rupees then

$$x \times 810 = 60 \times 1200 \times \frac{117}{100}$$

$$x = \frac{60 \times 12 \times 117}{810} = \text{Rs 104}$$

Hence the required selling price = Rs. 104 per copy

385. (a) Let the selling price be x rupees

$$\text{Then profit} = \frac{1}{12}x = 120$$

$$x = \text{Rs 1440}$$

$$\text{Cost price} = 1440 - 120$$

$$= \text{Rs 1320}$$

$$\text{Loss occurred} = \frac{1}{6} \times 1440$$

$$= 240$$

$$\text{Loss percentage} = \frac{240}{1320} \times 100$$

$$= \frac{2}{11} \times 10 = 18 \frac{2}{11} \% \approx 18\% (\text{loss})$$

386. (c) Let he sold the remaining quantity at $x\%$ profit
Total profit

$$= \frac{-1}{4} \times 20\% + \frac{3}{4} \times x\%$$

$$\Rightarrow 40\% = -5\% + \frac{3}{4} \times x\%$$

$$\frac{3}{4} \times x\% = 45$$

$$x = 60\%$$

Hence he must sell the remaining quantity at 60% profit

$$\text{387. (b)} \quad x\% = 30 + 20 + 10 - \left(\frac{30 \times 20 + 20 \times 10 + 10 \times 30}{100} \right) +$$

$$\frac{30 \times 20 \times 10}{(100)^2} = 60 - 11 + 6 = 49.6\%$$

$$\text{and } y\% = 15 + 25 + 20$$

$$- \left(\frac{15 \times 25 + 25 \times 20 + 20 \times 15}{100} \right)$$

$$+ \frac{15 \times 25 \times 20}{(100)^2} = 60 - 11.75 +$$

$$.75 = 49\%$$

$$\text{Hence } x > y$$



03

COMPOUND INTEREST

Money

I Said to be lent compound interest (C.I.), if the interest is not paid as soon as it falls due but it is added to the principal after a fixed period, so that the amount, s at the end of the period becomes the principal for the next period.

Note

- (1) Unless there is a mention of CI, the problem should be treated as that of SI.
- (2) The compound interest and the simple interest for one year are the same when the principal and the rate of interest are the same, provided that the interest is calculated annually.
- (3) If the interest is payable half yearly, the time is doubled and the rate becomes half.

For example, if the rate of interest is 10% per annum and the money is kept for 1 year, then if the rate is calculated half yearly, then $r = 5\%$ and time is 2 years.

Important Facts and Formulae

If principal = Rs. P , Time = t years, Rate = $R\%$ p.a.

- (i) When interest is compounded annually:

Amount after t years = $A =$

$$P \left(1 + \frac{R}{100} \right)^t$$

- (ii) When interest is compounded half-yearly

Principal = Rs. P , Time = t years = $(2t)$ half years,

Rate = $R\%$ p.a. = $(R/2\%)$ per half-yearly

Amount after t years =

$$P \left(1 + \frac{R/2}{100} \right)^{2t}$$

- (iii) When interest is compounded quarterly:

Principal = Rs. P , Rate = $R\%$ p.a. = $(R/4)\%$ per quarter, Time = t years = $(4t)$ quarters.

Amount after t years =

$$A = P \left(1 + \frac{R/4}{100} \right)^{4t}$$

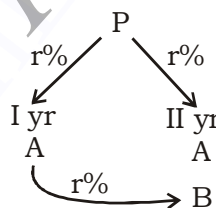
- (iv) When rate of interest is $R_1\%$, $R_2\%$ & $R_3\%$ for 1st year, 2nd year and 3rd year respectively, then

Amount after 3 years

$$= \text{Rs. } P \left(1 + \frac{R_1}{100} \right) \left(1 + \frac{R_2}{100} \right) \left(1 + \frac{R_3}{100} \right)$$

CI for two years

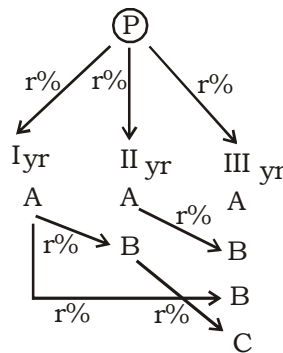
Let Principal = P and rate = $r\%$ per annum



i.e. CI = $2A + B$ (for 2 years)
& CI for II year = $A + B$

CI for three years

Let principal = P and rate = $r\%$ p.a.



$\therefore$ CI for (3 years) = $3A + 3B + C$

CI for II year = $A + B$ and

CI for III year = $A + 2B + C$

e.g. $P = \text{Rs. } 1000$, $r = 10\%$

$\therefore A = 10\%$ of $1000 = 100$

$B = 10\%$ of $100 = 10$

$C = 10\%$ of $10 = 1$

$\therefore$ CI for 3 years = $3A + 3B + C$

= $300 +$

$30 + 1 = 331$

- When difference between the compound interest and simple interest on a certain sum of money for 2 years at $R\%$ rate is Rs. D then

$$\frac{R}{100} = \sqrt{\frac{D}{P}}$$

Where, P = Principal D = Difference

EXAMPLES

1. Raviraj invested a sum of ₹10,000 at compound interest rate of 10 percent per annum for a period of three years. What amount will Raviraj get after 3 years?

(a) ₹12340 (b) ₹13210

(c) ₹13320 (d) ₹13310

Sol. (d) $P = \text{Rs. } 10,000$

$r = 10\%$ p.a.

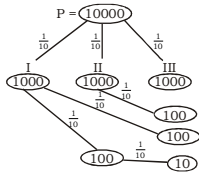
$t = 3$ years

$$A = P \left[1 + \frac{r}{100} \right]^t$$

$$A = 10000 \left[1 + \frac{10}{100} \right]^3$$

$$= 10000 \left(\frac{11}{10} \right)^3$$

= Rs. 13310

**Alternate**

$$CI = 3310$$

$$\therefore \text{Amount} = 10000 + 3310 = \text{Rs. } 13310$$

2. Seema invested a sum of ₹16000 for two years at compound interest and received an amount of ₹17640 on maturity. What is the rate of interest?
- (a) 9 p.c.p.a. (b) 5 p.c.p.a.
(c) 4 p.c.p.a. (d) 3 p.c.p.a.

Sol. (b) P = Rs. 16000

$$A = \text{Rs. } 17640$$

$$t = 2 \text{ years}$$

$$A = P \left[1 + \frac{r}{100} \right]^t$$

$$17640 = 16000 \left(1 + \frac{r}{100} \right)^2$$

$$\frac{1764}{1600} = \left(1 + \frac{r}{100} \right)^2$$

$$\frac{441}{400} = \left(1 + \frac{r}{100} \right)^2$$

$$\left(\frac{21}{20} \right)^2 = \left(1 + \frac{r}{100} \right)^2$$

Rooting both sides

$$\frac{r}{100} = \frac{1}{20}$$

$$r = 5\%$$

Alternate

$$\begin{array}{l} \sqrt{1600} : \sqrt{1764} \\ 40 : 42 \\ 20 : 21 \\ \hline 1 \end{array}$$

$$\Rightarrow \text{Rate } \frac{1}{20} \times 100 = 5\%$$

3. Find the amount of ₹1000 in 1 year at 5 percent per annum compound interest payable half-yearly.

(a) ₹1050 (Approx)

(b) ₹950 (Approx)

(c) ₹1125 (Approx)

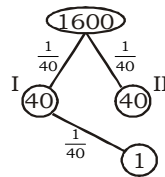
(d) ₹1025 (Approx)

Sol. (a) P = Rs. 1000

$$r = \frac{5}{2} \% \text{ (half yearly)} = \frac{1}{40}$$

$$t = 1 \times 2 = 2 \text{ half years}$$

$$\text{Let principal} = 1600 \text{ units}$$



$$C.I = 40 + 40 + 1 = 81 \text{ units}$$

$$\text{Amount} = 1600 + 81 = 1681 \text{ units}$$

$$\text{Now, } 1600 \text{ units} = \text{Rs. } 1000$$

$$1 \text{ unit} = \frac{1000}{1600} = \text{Rs. } \frac{5}{8}$$

then, Amount

$$= 1681 \times \frac{5}{8}$$

$$= \text{Rs. } 1050.625$$

4. Find the amount on ₹6400 in 1 year 6 months at 5 p.c.p.a. compound interest, interest being calculated half yearly.

(a) ₹6882.10 (b) ₹6892.10

(c) ₹6982.10 (d) ₹7282.05

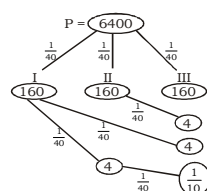
Sol. (b) P = Rs. 6400

$\therefore$ Compounded half yearly

$$t = \frac{3}{2} \times 2$$

$$= 3 \text{ half years}$$

$$r = \frac{5}{2} \% = \frac{1}{40}$$



$$CI = (3 \times 160) + (3 \times 4) + \frac{1}{10}$$

$$= 492.10$$

$$A = 6400 + 492.10$$

$$= \text{Rs. } 6892.10$$

5. Find the compound interest on ₹10000 in 9 months at 4 p.c.p.a interest payable quarterly.

(a) ₹303 (Approx)

(b) ₹313 (Approx)

(c) ₹203 (Approx)

(d) ₹204 (Approx)

Sol. (a) P = Rs. 10,000

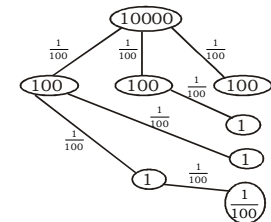
$$t = 9 \text{ months}$$

$$= \frac{9}{12} \times 4 \text{ (quarterly)}$$

$$= 3 \text{ quarters}$$

$$r = \frac{4}{4} \text{ (quarterly)}$$

$$= 1\% \text{ per. quarter} = \frac{1}{100}$$



$$CI = 100 + 100 + 100 + 1 + 1 + 1 + \frac{1}{100}$$

$$= 303.01$$

6. Find the compound interest on ₹8000 in 3 months at 5 p.c.p.a interest payable quarterly

(a) ₹250 (b) ₹200

(c) ₹150 (d) ₹100

Sol. (d) P = Rs. 8000

$$t = 3 \text{ months}$$

$$= \frac{3}{12} \times 4 \text{ (quarterly)}$$

$$= 1 \text{ quarter}$$

$$r = \frac{5}{4} \times \frac{1}{100} \text{ (quarterly)}$$

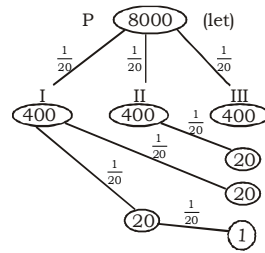
$$= \frac{1}{80} \text{ per. quarter}$$

Sol. (a) $t = 3$ years

$$r = 5\% = \frac{1}{20}$$

CI = Rs. 63.05

$$\text{Let } P = (20)^3 = 8000$$



$$1261 \text{ units} \longrightarrow 63.05$$

$$1 \text{ unit} \longrightarrow \frac{63.05}{1261}$$

$$\therefore P(8000 \text{ units}) = \frac{6305}{100} \times \frac{8000}{1261} = \text{Rs. } 400$$

Alternate:

$$5\% = \frac{1}{20}$$

Principal	Amount
20	21
20	21
20	21
8000	9261
	1261

$$1261 \text{ units} \rightarrow 63.05$$

$$\text{Principal (8000 units)} \rightarrow$$

$$\frac{63.05}{1261} \times 8000 = \text{Rs. } 400$$

9. ₹ 50000 is borrowed at CI at the rate of 1% for the first year, 2% for the second year and 3% for the third year. Find the amount to be paid after 3 years.

$$(a) ₹ 50355.3 \quad (b) ₹ 53055.3$$

$$(c) ₹ 53505.3 \quad (d) ₹ 53053.5$$

Sol. (b) $P = \text{Rs. } 50,000$

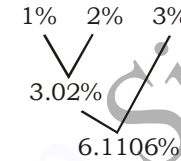
$$t = 3 \text{ years}$$

$$r = 1\%, 2\%, 3\%$$

$$1\%, 2\% = 1 + 2 + \frac{1 \times 2}{100} = 3.02\%$$

$$\text{Now, } 3.02\%, 3\% = 3.02 + 3 +$$

$$\frac{3.02 \times 3}{100} = 6.1106\%$$

OR

$$\text{CI} = 6.1106\% \text{ of } 50000$$

$$= \frac{61106}{10000} \times \frac{50000}{100} = \text{Rs. } 3055.3$$

$$\therefore A = 50000 + 3055.3 = \text{Rs. } 53055.3$$

Alternate

$$\text{Amount} = 50000 \times \frac{101}{100} \times \frac{51}{50} \times \frac{103}{100} = \text{Rs. } 53055.3$$

10. ₹ 125000 is borrowed at CI at the rate of 2% for the first year, 3% for the second year and 4% for the third year. Find the amount to be paid after 3 years.

$$(a) ₹ 135678 \quad (b) ₹ 136587$$

$$(c) ₹ 163578 \quad (d) ₹ 136578$$

Sol. (d) $P = \text{Rs. } 125000$

$$r = 2\%, 3\%, 4\%$$

$$t = 3 \text{ years}$$

$$\text{Amount} =$$

$$125000 \times \frac{51}{50} \times \frac{103}{100} \times \frac{26}{25} = \text{Rs. } 136578$$

11. At what rate percent compound interest, will ₹ 400 amount to ₹ 441 in 2 years?

$$(a) 4\% \quad (b) 5\%$$

$$(c) 6\% \quad (d) 3\%$$

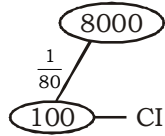
Sol. (b) $P = \text{Rs. } 400$

$$A = \text{Rs. } 441$$

$$t = 2 \text{ years}$$

$$A = P \left(1 + \frac{r}{100} \right)^t$$

$$441 = 400 \left(1 + \frac{r}{100} \right)^2$$



$$\therefore \text{CI} = ₹ 100$$

7. What principal will amount to ₹ 1352 in 2 years at 4 p.c.p.a compound interest?

$$(a) ₹ 1520 \quad (b) ₹ 1260$$

$$(c) ₹ 1250 \quad (d) ₹ 1220$$

Sol. (c) $A = \text{Rs. } 1352$

$$t = 2 \text{ years}$$

$$r = 4\% \text{ p.a.}$$

$$1352 = P \left(1 + \frac{4}{100} \right)^2$$

$$1352 = P \left(\frac{26}{25} \right)^2$$

$$P = \frac{1352 \times 25 \times 25}{26 \times 26}$$

$$P = \text{Rs. } 1250$$

Alternate:

$$4\% = \frac{1}{25}$$

Principal	Amount
25	26
25	26
625	676
XC	
$\times 2$	$\times 2$
1250	1352

$$\therefore P = \text{Rs. } 1250$$

8. On what principal will the compound interest for 3 years at 5 p.c.p.a amount to ₹ 63.05?

$$(a) ₹ 400 \quad (b) ₹ 500$$

$$(c) ₹ 450 \quad (d) ₹ 550$$



$$\left(\frac{21}{20}\right)^2 = \left(1 + \frac{r}{100}\right)^2$$

$$\frac{21}{20} = 1 + \frac{r}{100}$$

$$\frac{r}{100} = \frac{1}{20}$$

$$r = 5\% \text{ p.a.}$$

Alternate

$$\sqrt{400} : \sqrt{441}$$

$$20 : 21$$

$$1$$

$$\text{Rate} = \frac{1}{20} \times 100 = 5\% \text{ p.a.}$$

12. At what rate percent compound interest will ₹ 625 amount to ₹ 676 in 2 years?

- (a) 3% (b) 2%
(c) 4% (d) 5%

Sol. (c) P = Rs. 625

$$A = \text{Rs. } 676$$

$$t = 2 \text{ years}$$

$$\sqrt{625} : \sqrt{676}$$

$$25 : 26$$

$$1$$

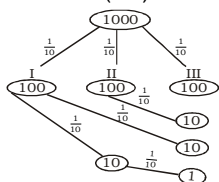
$$\text{Rate} = \frac{1}{25} \times 100 = 4\% \text{ p.a.}$$

13. On what sum will the amount for 2.5 years at 10 p.c.p.a becomes ₹ 6352.50?

- (a) ₹ 4900 (b) ₹ 5500
(c) ₹ 5000 (d) ₹ 5800

Sol. (c) $R = 10\% = \frac{1}{10}$

$$\text{Let } P = (10)^3 = 1000$$



$$CI = 100 + 100 + 10 + \frac{121}{2}$$

$$= 270.5 \text{ (for 2.5 years)}$$

$$\therefore A = 1270.50$$

$$1270.50 \text{ units} \longrightarrow 6352.50$$

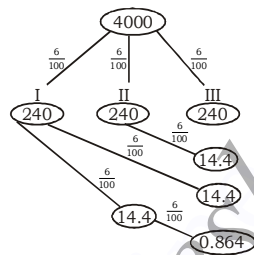
$$1 \text{ unit} \longrightarrow \frac{635250}{127050}$$

$$\text{Principal (1000 units)} \longrightarrow \text{Rs. } 5000$$

14. Find the amount on ₹ 4000 for 2.5 years at 6 p.c.p.a compound interest.

- (a) ₹ 4629.23 (b) ₹ 4692.32
(c) ₹ 4639.32 (d) ₹ 4682.32

Sol. (a)



$$CI \text{ for IIIrd year} = 269.664$$

$$CI \text{ for six months of 3rd year}$$

$$= \frac{269.664}{2} = 134.832$$

$$A = P + CI$$

$$= 4000 + 240 + 254.4 + 134.832$$

$$= \text{Rs. } 4629.232$$

15. A sum of money placed at compound interest doubles itself in 6 years. In how many years will it amount to 16 times itself?

- (a) 24 years (b) 26 years
(c) 22 years (d) 20 years

Sol. (a) $\textcircled{1} \xrightarrow{6 \text{ yr}} \textcircled{2}$

$$2^1 \longrightarrow 6 \text{ years}$$

$$2^4 \longrightarrow 4 \times 6$$

$$= 24 \text{ years}$$

16. A sum of money placed at compound interest thrice itself in 4 years. In how many years will it amount to 27 times itself?

- (a) 12 years (b) 15 years
(c) 14 years (d) 10 years

Sol. (a) $\textcircled{1} \xrightarrow{4 \text{ yr}} \textcircled{3}$

$$3^1 \longrightarrow 4 \text{ years}$$

$$3^3 \longrightarrow 4 \times 3$$

$$= 12 \text{ years}$$

17. If a sum of money at compound interest amount to thrice itself in 3 years, then in how many years will it be 9 times itself?

- (a) 12 years (b) 6 years
(c) 9 years (d) 15 years

Sol. (b) $\textcircled{1} \xrightarrow{3 \text{ yr}} \textcircled{3}$

$$3^1 \longrightarrow 3 \text{ years}$$

$$3^2 \longrightarrow 3 \times 2$$

$$= 6 \text{ years}$$

18. At what rate in the compound interest, does a sum of money becomes four folds in 2 years?

- (a) 150% (b) 100%
(c) 200% (d) 75%

Sol. (b) $4 = 1 \left(1 + \frac{r}{100}\right)^2$

$$2 = 1 + \frac{r}{100}$$

$$r = 100\% \text{ p.a.}$$

19. At what rate p.c.p.a in the compound interest, does a sum of money becomes 27 times in 3 years?

- (a) 100% (b) 150%
(c) 75% (d) 200%

Sol. (d) $27 = 1 \left(1 + \frac{r}{100}\right)^3$

$$3 = 1 + \frac{r}{100}$$

$$\frac{r}{100} = 2$$

$$r = 200\% \text{ p.a.}$$

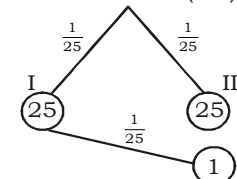
20. If the CI on a certain sum for 2 years at 4 p.c.p.a be ₹ 510, what would be the SI?

- (a) ₹ 500 (b) ₹ 505
(c) ₹ 400 (d) ₹ 475

Sol. (a) $r = 4\% = \frac{1}{25}$

$$t = 2 \text{ years}$$

$$P = 625 \text{ (Let)}$$





$$51 \text{ units} \text{ --- } 510$$

$$\therefore 1 \text{ unit} \text{ --- } 10$$

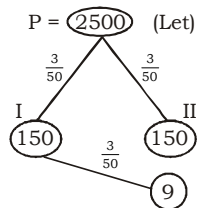
$$\therefore \text{SI} = 50 \times 10 \\ = \text{Rs. } 500$$

21. If the CI on a certain sum for 2 years at 6 p.c.p.a be ₹25.75, what would be the SI?

- (a) ₹25 (b) ₹24
(c) ₹20 (d) ₹15

Sol. (a) $t = 2$ years

$$r = 6\% = \frac{6}{100} = \frac{3}{50}$$



$$309 \text{ units} \text{ --- } 25.75$$

$$1 \text{ unit} \text{ --- } \frac{25.75}{309}$$

$$\text{S.I.} = \frac{25.75}{309} \times 300 = \text{Rs. } 25$$

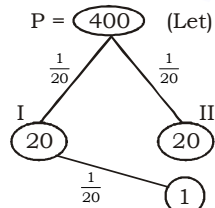
22. The simple interest on a certain sum of money for 2 years at 5 p.c.p.a is ₹100. Find the compound interest at the same rate and for the same time.

- (a) ₹102.50 (b) ₹103
(c) ₹103.50 (d) ₹102.25

Sol. (a) $t = 2$ years

$$r = 5\% = \frac{5}{100} = \frac{1}{20}$$

$$\text{SI} = \text{Rs. } 100 \text{ (Given)}$$



$$40 \text{ units} \text{ --- } 100$$

$$1 \text{ unit} \text{ --- } \frac{100}{40}$$

$$\therefore \text{CI (41 units)} = \frac{100}{40} \times 41$$

$$= \text{Rs. } 102.50$$

23. The simple interest on a certain sum of money for 2 years at 6 p.c.p.a is ₹300. Find the compound interest at the same rate and for the same time.

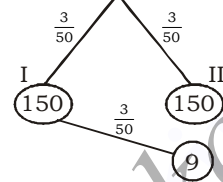
- (a) ₹310 (b) ₹308
(c) ₹307 (d) ₹309

Sol. (d) $t = 2$ years

$$r = 6\% = \frac{6}{100} = \frac{3}{50}$$

$$\text{SI} = \text{Rs. } 300$$

$$P = 2500 \text{ (Let)}$$



$$300 \text{ units} \text{ --- } \text{Rs. } 300$$

$$1 \text{ unit} \text{ --- } \text{Rs. } 1$$

$$\therefore \text{CI (30 units)} = \frac{300}{300} \times 309 \\ = \text{Rs. } 309$$

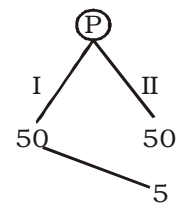
24. The compound interest on a certain sum for 2 years is ₹105 and simple interest is ₹100. Find the rate of interest per annum and the sum.

- (a) 10%, ₹500
(b) 10%, ₹1000
(c) 20%, ₹1000
(d) 4%, ₹1500

Sol. (a) SI = Rs. 100

$$\text{CI} = \text{Rs. } 105$$

$$t = 2 \text{ years}$$



$$\text{Rate} = \frac{5}{50} \times 100 = 10\% \text{ p.a.}$$

$$\text{and, } P \times \frac{10}{100} = 50$$

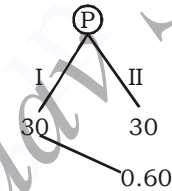
$$P = \text{Rs. } 500$$

25. The compound interest on a certain sum for 2 years is ₹60.60 and simple interest is ₹60. Find the rate of interest per annum and the sum.

- (a) 2%, ₹1600 (b) 2%, ₹1400
(c) 3%, ₹1500 (d) 2%, ₹1500

Sol. (d) SI = Rs. 60

$$\text{CI} = \text{Rs. } 60.60$$



$$\text{Rate} = \frac{0.60}{30} \times 100$$

$$= \frac{60}{30} \times \frac{100}{100} = 2\%$$

$$\text{and, } P \times \frac{2}{100} = 30$$

$$P = \text{Rs. } 1500$$

26. On a certain sum of money, the simple interest for 2 years is ₹150 at the rate of 3% per annum. Find the difference in CI and SI.

- (a) ₹5 (b) ₹4.5
(c) ₹2.5 (d) ₹2.25

Sol. (d) S.I. = Rs. 150

$$r = 3\% \text{ p.a.}$$

$$t = 2 \text{ years}$$

$$\text{S.I.} = \frac{P \times r \times t}{100}$$

$$150 = \frac{P \times 3 \times 2}{100}$$

$$P = \text{Rs. } 2500$$

$$\text{Now, } \frac{D}{P} = \left(\frac{r}{100} \right)^2$$

Where, D = difference between CI & SI for 2 year

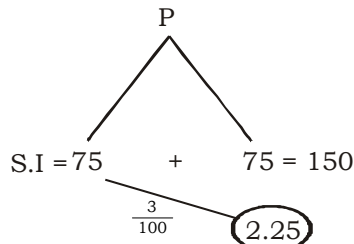
$$\frac{D}{2500} = \frac{9}{100 \times 100}$$

$$D = \frac{9}{4}$$

$$D = \text{Rs. } 2.25$$

**Alternate**

$$\text{Rate } 3\% = \frac{3}{100}$$



Difference of C.I & S.I for 2 year = Rs. 2.25

27. On a certain sum of money, the simple interest for 2 years is ₹200 at the rate of 7% per annum. Find the difference in CI and SI.

- (a) ₹7 (b) ₹6
(c) ₹3.5 (d) ₹45

Sol. (a) S.I. = Rs. 200

$$r = 7\% \text{ p.a.}$$

$$t = 2 \text{ years}$$

$$\text{S.I.} = \frac{P \times r \times t}{100}$$

$$200 = \frac{P \times 7 \times 2}{100}$$

$$P = \text{Rs. } \frac{10000}{7}$$

$$\text{Now, } \frac{D}{P} = \left(\frac{r}{100} \right)^2$$

$$\frac{D \times 7}{10000} = \frac{49}{10000}$$

$$D = \text{Rs. } 7$$

Alternate

$$\text{S.I} = \text{for one year} = \frac{200}{2} = 100$$

∴ Required difference

$$= 100 \times \frac{7}{100} = \text{Rs. } 7$$

28. The difference between the compound interest and the

simple interest on a certain sum of money at 10% per annum for 2 years is ₹2.50. Find the sum.

- (a) ₹350 (b) ₹275
(c) ₹250 (d) ₹325

Sol. (c) $r = 10\%$

$$t = 2 \text{ years}$$

$$\text{C.I.} - \text{S.I.} = \text{Rs. } 2.50$$

$$\frac{D}{P} = \left(\frac{r}{100} \right)^2$$

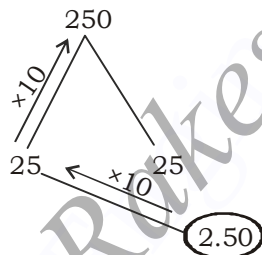
$$\frac{2.50}{P} = \left(\frac{10}{100} \right)^2$$

$$\frac{2.50}{P} = \frac{1}{100}$$

$$P = \text{Rs. } 250$$

Alternate:

$$\text{Rate} = 10\% = \frac{1}{10}$$



∴ Principal = Rs. 250

29. The difference between the compound interest and the simple interest on a certain sum of money at 4% per annum for 2 years is ₹1.40. Find the sum.

- (a) ₹875 (b) ₹857
(c) ₹787 (d) ₹925

Sol. (a) $r = 4\%$

$$t = 2 \text{ years}$$

$$\text{C.I.} - \text{S.I.} = \text{Rs. } 1.40$$

$$\frac{D}{P} = \left(\frac{r}{100} \right)^2$$

$$\frac{1.40}{P} = \left(\frac{4}{100} \right)^2$$

$$P = \text{Rs. } 875$$

Alternate

$$\text{Rate} = 4\% = \frac{1}{25}$$

$$\begin{aligned} \text{Principal} &= 1.40 \times \frac{25}{1} \times \frac{25}{1} \\ &= \text{Rs. } 875 \end{aligned}$$

30. Find the difference between the compound interest and the simple interest for the sum of ₹625 at 8% per annum for 2 years.

- (a) ₹3 (b) ₹4
(c) ₹4.5 (d) ₹1.5

Sol. (b) $P = \text{Rs. } 625$

$$r = 8\% \text{ p.a.}$$

$$t = 2 \text{ years}$$

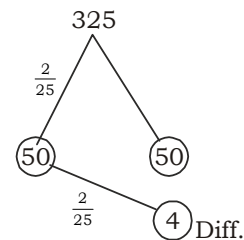
$$\frac{D}{P} = \left(\frac{r}{100} \right)^2$$

$$\frac{D}{625} = \left(\frac{8}{100} \right)^2$$

$$D = \text{Rs. } 4$$

Alternate

$$\text{Rate} = 8\% = \frac{2}{25}$$



31. Find the difference between the compound interest and the simple interest for the sum of ₹2500 at 6% per annum for 2 years.

- (a) ₹9 (b) ₹8
(c) ₹7.5 (d) ₹6

Sol. (a) $P = \text{Rs. } 2500$

$$r = 6\% \text{ p.a.}$$

$$t = 2 \text{ years}$$

$$\frac{D}{P} = \left(\frac{r}{100} \right)^2$$

$$\frac{D}{2500} = \frac{6 \times 6}{100 \times 100}$$

$$D = \text{Rs. } 9$$

32. On what sum will the difference between the simple and compound interests for 3 years at 5 percent per annum amount to ₹12.20?

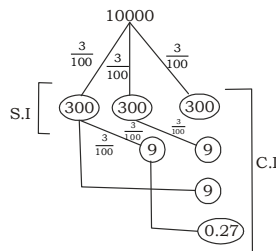


$$\frac{D}{10000} = \left(\frac{3}{100}\right)^2 \left(\frac{303}{100}\right)$$

$$D = \frac{9}{10000} \times \frac{303}{100} \times 10000$$

$$D = \text{Rs. } 27.27$$

Alternate:



Required difference
= 9 + 9 + 9 + 0.27 = Rs. 27.27

35. Find the difference between the simple and compound interest on ₹8000 for 3 years at 5 p.c.p.a.

- (a) ₹61 (b) ₹60
(c) ₹51 (d) ₹59

Sol. (a) P = Rs. 8000

t = 3 years

r = 5% p.a.

$$\frac{D}{P} = \left(\frac{r}{100}\right)^2 \left(\frac{300+r}{100}\right)$$

$$\frac{D}{8000} = \left(\frac{5}{100}\right)^2 \left(\frac{305}{100}\right)$$

$$D = 8000 \left(\frac{5}{100}\right)^2 \left(\frac{305}{100}\right)$$

$$D = \frac{25}{10000} \times \frac{305}{100} \times 8000$$

$$D = \text{Rs. } 61.$$

36. A certain amount of money at compound interest grows upto ₹7520 in 15 years and upto ₹7896 in 16 years. Find the rate percent per annum.

- (a) 10% (b) 8%
(c) 5% (d) 6.5%

Sol. (c) 15 years 16 years



$$\text{Rate} = \frac{376}{7520} \times 100 = 5\%$$

37. A certain amount of money at compound interest grows upto

₹3840 in 4 years and upto ₹3996 in 5 years. Find the rate percent per annum.

- (a) 2.05% (b) 2.5%
(c) 4.0625% (d) 3.5%

Sol. (c) 4 years 5 years



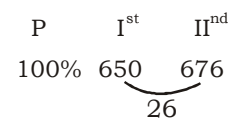
$$r = \frac{156}{3840} \times 100$$

$$= 4.0625\%$$

38. What sum of money at compound interest will amount to ₹650 at the end of the first year and ₹676 at the end of the second year?

- (a) ₹625 (b) ₹630
(c) ₹620 (d) ₹720

Sol. (a)



$$\text{Rate} = \frac{26}{650} \times 100$$

$$= 4\%$$

Let P = 100

$$104\% = 650$$

$$1\% = \frac{650}{104}$$

$$100\% = \frac{650}{104} \times 100$$

$$P = \text{Rs. } 625$$

39. What sum of money at compound interest will amount to ₹480 at the end of the first year and ₹576 at the end of the second year?

- (a) ₹420 (b) ₹450
(c) ₹400 (d) ₹375

Sol. (c) P Ist IInd



$$\text{Rate} = \frac{96}{480} \times 100 = 20\%$$

$$120\% = 480$$

$$1\% = \frac{480}{120}$$

- (a) ₹1600 (b) ₹800
(c) ₹1200 (d) ₹1500

Sol. (a) C.I. - S.I. = Rs. 12.20

r = 5% p.a.

t = 3 years

$$\frac{D}{P} = \left(\frac{r}{100}\right)^2 \left(\frac{300+r}{100}\right)$$

$$\frac{12.20}{P} = \left(\frac{5}{100}\right)^2 \left(\frac{300+5}{100}\right)$$

$$\frac{12.20}{P} = \frac{25}{100} \times \frac{1}{100} \times \frac{305}{100}$$

$$\frac{1220}{100P} = \frac{1}{400} \times \frac{305}{100}$$

$$P = \text{Rs. } 1600$$

33. On what sum will the difference between the simple and compound interests for 3 years at 4 percent per annum amount to ₹3.04

- (a) ₹1250 (b) ₹625
(c) ₹650 (d) ₹675

Sol. (b) C.I. - S.I. = Rs. 3.04

r = 4% p.a.

t = 3 years

$$\frac{D}{P} = \left(\frac{r}{100}\right)^2 \left(\frac{300+r}{100}\right)$$

$$\frac{3.04}{P} = \left(\frac{4}{100}\right)^2 \left(\frac{304}{100}\right)$$

$$\frac{304}{P} \times \frac{1}{100} = \frac{16}{10000} \times \frac{304}{100}$$

$$P = \text{Rs. } 625$$

34. Find the difference between the simple and compound interest on ₹10000 for 3 years at 3 p.c.p.a.

- (a) ₹27.8 (b) ₹27.27
(c) ₹37.7 (d) ₹37.8

Sol. (b) P = Rs. 10000

r = 3% p.a.

t = 3 years

$$\frac{D}{P} = \left(\frac{r}{100}\right)^2 \left(\frac{300+r}{100}\right)$$



$$100\% = \frac{480}{120} \times 100$$

$$\therefore P = \text{Rs. } 400$$

40. Find the ratio of CI to SI on a certain sum at 5% per annum for 2 years.

- (a) 41:40 (b) 42:41
(c) 43:40 (d) 41:35
(e) None of these

- Sol. (a) SI Percent for two years = 10%
CI Percent for two years

$$= 5 + 5 + \frac{5 \times 5}{100} = 10.25\%$$

$$\begin{array}{lcl} \text{C.I.} & : & \text{S.I.} \\ 10.25 & : & 10 \end{array}$$

$$\text{Ratio} = 41 : 40$$

41. Find the ratio of CI to SI on a certain sum at 8% per annum for 2 years.

- (a) 27:26 (b) 26:25
(c) 26:21 (d) 25:24

- Sol. (b) SI percent for two years = 16%
CI percent for two years

$$= 8 + 8 + \frac{8 \times 8}{100} = 16.64\%$$

$$\begin{array}{lcl} \text{C.I.} & : & \text{S.I.} \\ 16.64 & : & 16 \\ 26 & : & 25 \end{array}$$

42. ₹ 2400 becomes ₹ 3000 in 3 years at a certain rate of compound interest. What will be the sum after 6 years?

- (a) ₹ 4750 (b) ₹ 3750
(c) ₹ 3570 (d) ₹ 3850

Sol. (b) $\frac{3000}{2400} = \frac{5}{4}$

$$\begin{array}{c} \text{3 years} \quad \quad \quad \text{Next 3 years} \\ 2400 \quad 3000 \quad (3000 \times \frac{5}{4}) = \text{Rs. } 3750 \\ \frac{5}{4} \quad \quad \quad \frac{5}{4} \end{array}$$

Therefore, sum after 6 years = Rs. 3750

43. ₹ 1200 becomes ₹ 3000 in 3 years at a certain rate of compound interest. What will be the sum after 6 years?
(a) ₹ 2433.25 (b) ₹ 2334.75
(c) ₹ 2343.75 (d) ₹ 7500

Sol. (d) $\frac{3000}{1200} = \frac{5}{2}$

$$\begin{array}{c} \text{3 years} \quad \quad \quad \text{Next 3 years} \\ 1200 \quad 3000 \quad (3000 \times \frac{5}{2}) = \text{Rs. } 7500 \\ \frac{5}{2} \quad \quad \quad \frac{5}{2} \end{array}$$

Therefore, sum after 6 years = Rs. 7500

44. Find the compound interest on ₹ 9375 in 2 years, the rate of interest being 2% for the first year and 4% for the second year.

- (a) ₹ 570 (b) ₹ 1140
(c) ₹ 1150 (d) ₹ 670

Sol. (a) $A = 9375 \times \frac{51}{50} \times \frac{26}{25}$

$$= \text{Rs. } 9945$$

$$\begin{aligned} \therefore \text{C.I.} &= A - P \\ &= 9945 - 9375 \\ &= \text{Rs. } 570 \end{aligned}$$

45. Find the compound interest on ₹ 8000 in 2 years the rate of interest being 5% for the first year and 10% for the second year.

- (a) ₹ 1340 (b) ₹ 1420
(c) ₹ 1240 (d) ₹ 1350

Sol. (c) $A = 8000 \times \frac{21}{20} \times \frac{11}{10}$

$$A = \text{Rs. } 9240$$

$$\text{C.I.} = A - P$$

$$= 9240 - 8000$$

$$= \text{Rs. } 1240$$

46. What sum of money at compound interest will amount to ₹ 526.38 in 3 years, if the rate of interest is 3% for the first year, 4% for the second year and 5% for the third year?

- (a) ₹ 400 (b) ₹ 450
(c) ₹ 468 (d) ₹ 520

Sol. (c) $526.38 = P \times \frac{103}{100} \times \frac{26}{25} \times \frac{21}{20}$

$$P = \text{Rs. } 468$$

47. What sum of money at compound interest will amount to ₹ 2893.8 in 3 years, If the rate of interest is 4% for the first year, 5% for the second year and 6% for the third year?

- (a) ₹ 2500 (b) ₹ 2400
(c) ₹ 2200 (d) ₹ 2250

Sol. (a) $2893.8 = P \times \frac{26}{25} \times \frac{21}{20} \times \frac{106}{100}$

$$P = \text{Rs. } 2500$$

48. A man borrows ₹ 4000 at 20% compound rate of interest. At the end of each year he pays back ₹ 1500. How much amount should he pay at the end of the third year to clear all his dues?

- (a) ₹ 2592 (b) ₹ 2852
(c) ₹ 2952 (d) ₹ 2953

Sol. (c) $4000 \xrightarrow[+800]{20\%} 4800 - 1500$

$$3300 \xrightarrow[+660]{20\%} 3960 - 1500$$

$$2460 \xrightarrow[+492]{20\%} 2952$$

49. A man borrows ₹ 3000 at 30% compound rate of interest. At the end of each year he pays back ₹ 1000. How much amount should he pay at the end of the third year to clear all his dues?

- (a) ₹ 3602 (b) ₹ 3601
(c) ₹ 3603 (d) ₹ 3604

Sol. (b) $3000 \xrightarrow[+900]{30\%} 3900 - 1000$

$$2900 \xrightarrow[+870]{30\%} 3770 - 1000$$

$$2770 \xrightarrow[831]{30\%} 3601$$

50. Divide ₹ 2708 between A and B, so that A's share at the end of 6 years may equal B's share at the end of 8 years, compound interest being 8% p.c.p.a.

- (a) ₹ 1458, ₹ 1250
(b) ₹ 1448, ₹ 1260
(c) ₹ 1438, ₹ 1270
(d) ₹ 1468, ₹ 1240



Sol (a)

$$\begin{aligned}
 & \text{2708} \\
 & \swarrow \quad \searrow \\
 & A \quad \quad B \\
 & A \left(1 + \frac{8}{100}\right)^6 = B \left(1 + \frac{8}{100}\right)^8 \\
 & A \left(\frac{27}{25}\right)^6 = B \left(\frac{27}{25}\right)^8 \\
 & \frac{A}{B} = \frac{729}{625} \\
 & 1354 \text{ Units} \longrightarrow 2708 \\
 & 1 \text{ Unit} \longrightarrow 2 \\
 & \therefore A : B \\
 & 729_{\times 2} : 625_{\times 2} \\
 & \therefore \text{Rs. 1458, Rs. 1250}
 \end{aligned}$$

51. Divide ₹6100 between A and B, so that A's share at the end of 3 years may equal B's share at the end of 5 years, compound interest being 20% p.c.p.a.

- (a) ₹3600, ₹2500
 (b) ₹3500, ₹2600
 (c) ₹3400, ₹2700
 (d) ₹3450, ₹2650

Sol. (a) $20\% = \frac{1}{5}$

Therefore, $\frac{\text{A's share}}{\text{B's share}} = \frac{6}{5}$

Difference of years = $5 - 3 = 2$ years

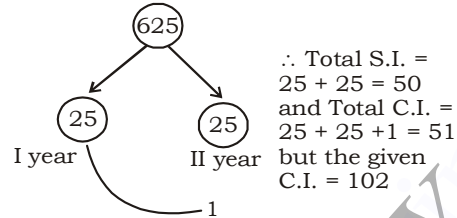
$$\begin{aligned}
 & \text{6100} \\
 & \swarrow \quad \searrow \\
 & A \quad \quad B \\
 & 3 \text{ years} \quad 5 \text{ years} \\
 & 36 \quad \quad 25 \\
 & 61 \text{ Units} \longrightarrow 6100 \\
 & 1 \text{ Unit} \longrightarrow 100 \\
 & \therefore A = \text{Rs. 3600} \\
 & B = \text{Rs. 2500}
 \end{aligned}$$

52. Compound interest compounded annually on a certain sum of money for 2 years at 4% per annum is Rs. 102. The simple interest on the same sum for the same rate and for the same period will be :

- (a) Rs. 99 (b) Rs. 101
 (c) Rs. 100 (d) Rs. 98

Sol. (c) $4\% = \frac{1}{25}$, $t = 2$ years

$\therefore$ Let amount = $(25)^2 = 625/-$



i.e. 51 Units $\longrightarrow$ 102

$\therefore 1 \text{ Unit} \longrightarrow \frac{102}{51} = 2$

$\therefore 25 \text{ Units} \longrightarrow 25 \times 2 = 50$

and 50 Units $\longrightarrow 50 \times 2 = 100$

$\therefore$ Total S.I. = Rs. 100

53. If the amount is 2.25 times of the sum after 2 years at compound interest (compound annually), the rate of interest per annum is :

- (a) 25 % (b) 30 %
 (c) 45 % (d) 50 %

Sol. (d) Let sum = Rs. 100
 $\therefore$ Amount after 2 years = $2.25 \times 100 = 225$

$$\begin{aligned}
 & \sqrt{100} = 10 \quad \quad \sqrt{225} = 15 \\
 & \quad \quad \quad \downarrow \\
 & \quad \quad \quad \text{5}
 \end{aligned}$$

$\therefore$ Rate of interest

$= \frac{5}{10} \times 100 = 50\%$

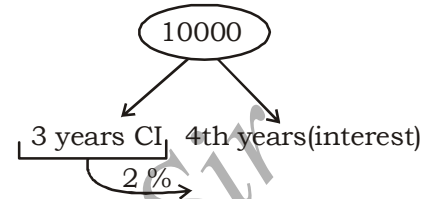
54. The compound interest on Rs. 10,000 in 2 years at 4% per annum, the interest being compounded half-yearly, is :
 (a) Rs. 636.80 (b) Rs. 824.32
 (c) Rs. 912.86 (d) Rs. 828.82

Sol. (b) Interest is compounded half yearly

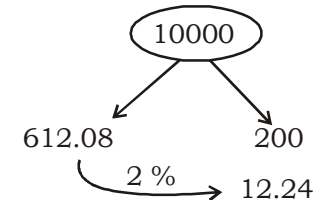
$\therefore \text{Rate} = \frac{4\%}{2} = 2\% \text{ \& Time}$

$= 2 \times 2 = 4 \text{ years}$

$\therefore$ Required CI =



$\therefore 3 \text{ yrs CI} = 3A + 3B + C$
 $= 3(2\% \text{ of } 10,000) + 3(2\% \text{ of } 2\% \text{ of } 10,000) + (2\% \text{ of } 2\% \text{ of } 2\% \text{ of } 10,000)$
 $= 600 + 12 + 0.08$
 $= 612.08$
 $\therefore$ Required CI =



$\therefore \text{Total C.I.} = 612.08 + 200 + 12.24 = 824.32$

55. In how many years will Rs. 2,000 amount to Rs. 2,420 at 10% per annum compound interest ?

- (a) 3 (b) $2\frac{1}{2}$
 (c) 2 (d) $1\frac{1}{2}$

Sol. (c) $A = P \left(1 + \frac{R}{100}\right)^n$

$\frac{2420}{2000} = \left(1 + \frac{10}{100}\right)^n$

$\left(\frac{11}{10}\right)^2 = \left(\frac{11}{10}\right)^n$

$= x = 2 \text{ year}$

$\therefore \text{Rate \%} = \frac{1}{10} \times 100 = 10\% =$
 given rate %

$\therefore$ Required time = 2 years

56. What is the difference between compound interests on Rs.

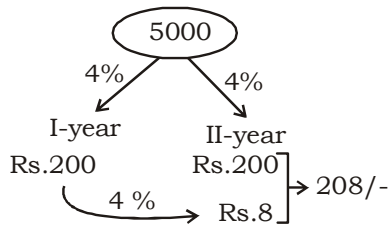
5,000 for $1\frac{1}{2}$ years at 4% per



annum according as the interest is compounded yearly or half-yearly ?

- (a) Rs. 2.04 (b) Rs. 3.06
(c) Rs. 8.30 (d) Rs. 4.80

Sol. (a) C.I. (when compounded annually)



∴ CI for $1\frac{1}{2}$ years

$$= 200 + \frac{1}{2} \times 208 = \text{Rs. } 304$$

When compounded half yearly, then

$$\text{Rate} = \frac{1}{2} \times 4\% = 2\% \text{ \& Time}$$

$$= 2 \times 1\frac{1}{2} = 3 \text{ yrs}$$

∴ Required CI = 3A + 3B + C

$$A = 2\% \text{ of } 5000 = \text{Rs. } 100$$

$$B = 2\% \text{ of } 100 = \text{Rs. } 2$$

$$C = 2\% \text{ of } 2 = \text{Rs. } 0.04$$

∴ Required CI = $3 \times 100 + 3 \times 2 + 0.04 = 306.04$

∴ Difference = $306.04 - 304$
Rs. = 2.04

57. The difference between the simple and compound interest on a certain sum of money for 2 years at 4% per annum is Re.1. The sum is :

- (a) Rs. 500 (b) Rs. 600
(c) Rs. 625 (d) Rs. 450

Sol. (c) As we know, for 2 years

$$\frac{R}{100} = \sqrt{\frac{D}{P}}$$

$$\Rightarrow \frac{4}{100} = \sqrt{\frac{1}{P}}$$

$$\Rightarrow P = (25)^2 = \text{Rs. } 625$$

58. The difference between the simple and compound interest on a certain sum of money at 5 % rate of interest per annum for 2 years is Rs. 15. Then the sum is:

- (a) Rs. 6,500 (b) Rs. 5,500
(c) Rs. 6,000 (d) Rs. 7,000

$$\text{Sol. (c)} \quad \frac{R}{100} = \sqrt{\frac{D}{P}}$$

$$\Rightarrow \frac{5}{100} = \sqrt{\frac{15}{P}}$$

$$\Rightarrow \sqrt{P} = \sqrt{15} \times 20$$

$$\Rightarrow P = 400 \times 15 = \text{Rs. } 6000$$

59. A sum borrowed under compound interest doubles itself in 10 years. When will it become four fold of itself at the same rate of interest ?

- (a) 15 years (b) 20 years
(c) 24 years (d) 40 years

Sol. (b)

$$P \xrightarrow{10 \text{ years}} 2P \xrightarrow{10 \text{ years}} 4P = 2^2 P \text{ in } 2 \times 10 = 20 \text{ yrs}$$

60. If the difference between the compound interest and simple interest on a sum at 5% rate of interest per annum for three years Rs. 36.60, then the sum is:

- (a) Rs. 8000 (b) Rs. 8400
(c) Rs. 4400 (d) Rs. 4800

Sol. (d) Let sum = Rs. 8000, for 3 years

$$\therefore \text{CI} = 3A + 3B + C \text{ \& SI} = 3A$$

$$\therefore \text{CI} - \text{SI} = 3B + C$$

$$A = 5\% \text{ of } 8000 = \text{Rs. } 400$$

$$B = 5\% \text{ of } 400 = \text{Rs. } 20$$

$$C = 5\% \text{ of } 20 = \text{Rs. } 1$$

$$\text{Required difference} = 3B + C = 3 \times 20 + 1$$

$$= \text{Rs. } 61$$

But the given difference

$$= \text{Rs. } 36.60 \text{ i.e.}$$

$$61 \text{ units} \longrightarrow 36.60$$

$$\therefore 8000 \text{ units} \longrightarrow \frac{36.6}{61} \times 8000 = 4800$$

$$\text{i.e. sum} = \text{Rs. } 4800$$

Alternate

$$\frac{D}{P} = \frac{R}{100} \times \frac{R}{100} \times \frac{(300 + R)}{100}$$

$$\frac{36.60}{P} = \frac{5}{100} \times \frac{5}{100} \times \frac{305}{100}$$

$$P = \frac{36.60 \times 100 \times 100 \times 100}{5 \times 5 \times 305}$$

$$P = \text{Rs. } 4800$$

61. A sum becomes Rs. 4500 after two years and Rs. 6750 after four years at compound interest. The sum is :

- (a) Rs. 4000 (b) Rs. 2500
(c) Rs. 3000 (d) Rs. 3050

Sol. (c)

$$P \xrightarrow{\text{after 2 years}} \text{Rs. } 4500 \xrightarrow{\text{after 2 years}} \text{Rs. } 6750$$

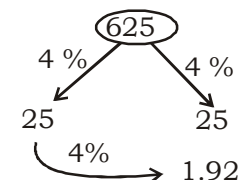
$$\frac{6750}{4500} = \frac{4500}{P} \text{ (}\therefore \text{ ratio will be same in case of CI)}$$

$$\Rightarrow P = 4500 \times \frac{2}{3} = \text{Rs. } 3000$$

62. What sum of money will become Rs.1352 in 2 years at 4 percent per annum compound interest ?

- (a) Rs. 1200 (b) Rs. 1225
(c) Rs. 1250 (d) Rs. 1300

Sol. (c) Let sum = Rs. 625



$$\therefore \text{Total CI} = 25 + 25 + 1 = 51$$

$$\therefore \text{Total sum (amount)} = 676$$

but the given amount = Rs. 1352
i.e.

$$676 \text{ units} \longrightarrow 1352$$

$$\therefore 625 \text{ units} \longrightarrow \frac{1352}{676} \times 625 = 1250$$

i.e. the sum = Rs. 1250

63. The difference between simple and compound interest



(compounded annually) on a sum of money for 2 years at 10% per annum is Rs. 65. The sum is:

- (a) Rs. 65650 (b) Rs. 65065
(c) Rs. 6565 (d) Rs. 6500

Sol. (d) For two years,

$$\frac{R}{100} = \sqrt{\frac{D}{P}}$$

$$\Rightarrow \frac{10}{100} = \sqrt{\frac{65}{P}}$$

$$\Rightarrow P = 65 \times 100 = \text{Rs. } 6500$$

64. A sum of money becomes eight times of itself in 3 years at compound interest. The rate of interest per annum is:

- (a) 100 % (b) 80 %
(c) 20 % (d) 10 %

Sol. (a)

$$\begin{array}{lcl} P & \xrightarrow{\text{in 3 years}} & 8P \\ \text{i.e. } 1 & \xrightarrow{\quad} & 8 \\ \sqrt[3]{1} & \xrightarrow{\quad} & \sqrt[3]{8} \quad (\text{when } P = 1) \\ 1 & \xrightarrow{\quad} & 2 \end{array}$$

$$\therefore \text{Rate}\% = \frac{2-1}{1} \times 100 = 100\%$$

65. The difference between the compound interest (compounded annually) and the simple interest on a sum of Rs. 1000 at a certain rate of interest for 2 years is Rs. 10. The rate of interest per annum is:

- (a) 5 % (b) 6 %
(c) 10 % (d) 12 %

Sol. (c) For 2 years,

$$\frac{R}{100} = \sqrt{\frac{D}{P}}$$

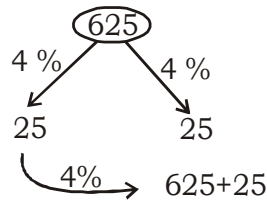
$$\Rightarrow \frac{R}{100} = \sqrt{\frac{10}{1000}} = \frac{1}{10}$$

$$\Rightarrow R = 10\%$$

66. The principal, which will amount to Rs. 270.40 in 2 years at the rate of 4 % per annum compound interest, is:

- (a) Rs. 200 (b) Rs. 225
(c) Rs. 250 (d) Rs. 220

Sol. (c) Let $P = \text{Rs. } 625$



$$\begin{aligned} \text{Amount} &= 625 + 25 + 1 \\ &= 676 \end{aligned}$$

But the given amount = Rs. 270.40

$$676 \text{ units} = \text{Rs. } 270.40$$

$$625 \text{ units} = \frac{270.40}{676} \times 625$$

$$= \text{Rs. } 250$$

i.e. sum = Rs. 250

Alternatively

Go through the options

67. At what rate percent per annum compound interest, will Rs. 2304 amount to Rs. 2500 in 2 years?

- (a) $5\frac{1}{2}\%$ (b) 5 %
(c) $4\frac{1}{2}\%$ (d) $4\frac{1}{6}\%$

Sol. (d)

$$2304 \longrightarrow 2500$$

$$\sqrt{2304} \longrightarrow \sqrt{2500} \quad (\text{for 2 years})$$

$$\Rightarrow 48 \longrightarrow 50$$

$$\therefore \text{Rate}\% = \frac{50-48}{48} \times 100$$

$$= \frac{1}{24} \times 100 = \frac{25}{6} = 4\frac{1}{6}\%$$

68. If the difference between the simple and compound interests on a sum of money for 2 years at 4 % per annum is Rs. 80, the sum is :

- (a) Rs. 5000 (b) Rs. 50000
(c) Rs. 10000 (d) Rs. 1000

$$\text{Sol. (b)} \quad \frac{R}{100} = \sqrt{\frac{D}{P}}$$

$$\Rightarrow \frac{4}{100} = \sqrt{\frac{80}{P}} \Rightarrow P = 80 \times 25 \times 25$$

$$\Rightarrow P = \text{Rs. } 50000$$

69. The compound interest on Rs. 16,000 for 9 months at 20% per annum, interest being compounded quarterly, is :

- (a) Rs. 2,520 (b) Rs. 2,524
(c) Rs. 2,522 (d) Rs. 2,518

Sol. (c) $\therefore$ CI is compounded quarterly,

$$\therefore \text{Rate} = \frac{1}{4} \times 20 = 5\%$$

$$\& \text{Time} = 9 \times 4 = 36 \text{ months} = 3 \text{ years}$$

$$\therefore \text{Required CI} = 3A + 3B + C = 3 \text{ years}$$

$$A = 5\% \text{ of } 16000 = \text{Rs. } 800$$

$$B = 5\% \text{ of } 800 = \text{Rs. } 40$$

$$C = 5\% \text{ of } 40 = \text{Rs. } 2$$

$$\therefore \text{Required CI} = 3 \times 800 + 3 \times 40 + 2 = \text{Rs. } 2522$$

70. If the difference between the compound and the simple interests on a certain sum of money for 3 years at 5% per annum is Rs. 15.25, then the sum is :

- (a) Rs. 2,000 (b) Rs. 1,000
(c) Rs. 1,500 (d) Rs. 2,500

Sol. (a) Let sum = Rs. 2000

$$\therefore \text{CI} = 3A + 3B + C \text{ (for 3 years)}$$

$$\& \text{SI} = 3A$$

$$\therefore \text{Difference} = \text{CI} - \text{SI} = 3B + C$$

$$A = 5\% \text{ of } 2000 = \text{Rs. } 100$$

$$B = 5\% \text{ of } 100 = \text{Rs. } 5$$

$$C = 5\% \text{ of } 5 = \text{Rs. } 0.25$$

$$\therefore \text{Difference} = 3 \times 5 + 0.25 = 15.25 = \text{given difference}$$

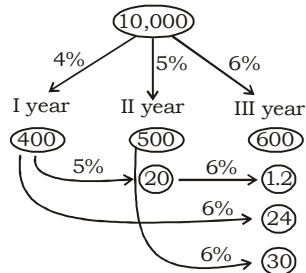
$$\text{hence, sum} = \text{Rs. } 2000$$

71. If the rate of interest be 4 % per annum for first year, 5% per annum for second year and 6 % per annum for third year, then the compound interest of Rs. 10,000 for 3 years will be :

- (a) Rs. 1,600 (b) Rs. 1,625.80
(c) Rs. 1,575.20 (d) Rs. 2,000



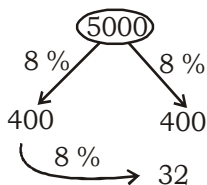
Sol. (c)



∴ Required CI
 = 400 + 500 + 600 + 20 + 1.2 + 24 + 30
 = Rs. 1575.20

72. A person deposited a sum of Rs. 6,000 in a bank at 5% per annum simple interest. Another person deposited Rs. 5,000 at 8% per annum compound interest. After two years, the difference of their interests will be :
- (a) Rs. 230 (b) Rs. 232
 (c) Rs. 832 (d) Rs. 600

Sol. (b) SI = $\frac{6000 \times 5 \times 2}{100} = \text{Rs. } 600$



i.e. C.I. = 832

∴ Difference = CI - SI
 = 832 - 600 = Rs. 232

73. The difference between compound interest and simple interest of a sum for 2 years at 8 percent is Rs. 768. The sum is:
- (a) Rs. 1,00,000
 (b) Rs. 1,10,000
 (c) Rs. 1,20,000
 (d) Rs. 1,70,000

Sol. (c) for 2 years,

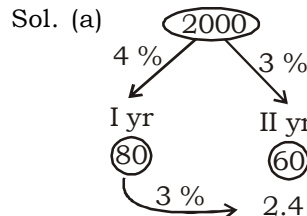
$$\frac{R}{100} = \sqrt{\frac{D}{P}}$$

$$\Rightarrow \frac{8}{100} = \sqrt{\frac{768}{P}}$$

$$\Rightarrow P = 768 \times \frac{100 \times 100}{8 \times 8}$$

$$= \text{Rs. } 1,20,000$$

74. The compound interest on Rs. 2000 in 2 years if the rate of interest is 4% per annum for the first year and 3% per annum for the second year, will be:
- (a) Rs. 142.40 (b) Rs. 140.40
 (c) Rs. 141.40 (d) Rs. 143.40



Required CI = 80 + 60 + 2.4
 = Rs. 142.40

75. A sum of Rs. 6000 is deposited for 3 years at 5% per annum compound interest (compounded annually). The difference of interests for 3 and 2 years will be:
- (a) Rs. 75.00 (b) Rs. 30.75
 (c) Rs. 330.75 (d) Rs. 375.00

Sol. (c) CI for 3 years = 3A + 3B + C
 & CI for 2 years = 2A + B
 ∴ Difference = A + 2B + C
 where, A = 5% of 6000
 = Rs. 300

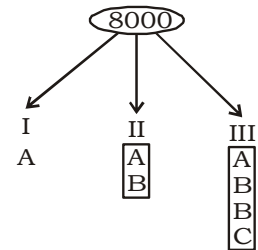
B = 5% of 300 = Rs. 15

C = 5% of 15 = Rs. 0.75

∴ Required difference = 300 + 2 × 15 + 0.75
 = Rs. 330.75

76. The compound interest on Rs. 8,000 at 15% per annum for 2 years 4 months, compounded annually is :
- (a) Rs. 2980 (b) Rs. 30.91
 (c) Rs. 3109 (d) Rs. 3100

Sol. (c) CI on Rs. 8000 at 15% per annum for 3 years.



where A = 15% of 8000
 = Rs. 1200

B = 15% of 1200 = Rs. 180

C = 15% of 180 = Rs. 27

∴ CI for 2 years = 2A + B
 = 2 × 1200 + 180 = Rs. 2580
 & CI for 3 year = A + 2B + C =
 1200 + 2 × 180 + 27 = Rs. 1587
 ∴ CI for 2 years 4 months

$$= 2580 + \frac{4}{12} \times 1587$$

= Rs. 3109

77. In what time will Rs. 10,000 amount to Rs. 13,310 at 20% per annum compounded half yearly?

(a) $1\frac{1}{2}$ years (b) 2 years

(c) $2\frac{1}{2}$ years (d) 3 years

Sol. (a) CI is compounded half yearly

$$\therefore \text{Rate} = \frac{20}{2} = 10\%$$

and Time = 2t

$$\text{Now, } \frac{13310}{10000} = \frac{1331}{1000} = \left(\frac{11}{10}\right)^3$$

$$\text{Here Rate} = \frac{11-10}{10} \times 100$$

= 10% = given rate

$$\therefore T = \frac{\text{time}}{2} = \frac{3}{2} = 1\frac{1}{2} \text{ years}$$

78. A certain sum of money yields Rs. 1261 as compound interest for 3 years at 5% per annum. The sum is:

(a) Rs. 9000 (b) Rs. 8400

(c) Rs. 7500 (d) Rs. 8000

Sol. (d) 5% = $\frac{1}{20}$ and t = 3 years

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$$\text{Here rate} = \frac{107 - 100}{100} \times 100$$

$$= 7\% = \text{given rate}$$

$$\text{hence required time} = 2 \text{ years}$$

Alternatively

Go through options

94. A certain amount of money at $r\%$, compounded annually after two and three years becomes Rs. 1440 and Rs. 1728 respectively. r is :

- (a) 5% (b) 10%
(c) 15% (d) 20%

Sol. (d) Required rate = r

$$= \frac{1728 - 1440}{1440} \times 100$$

$$= \frac{288}{1440} \times 100 = 20\%$$

95. The compound interest on a certain sum of money for 2 years at 10% per annum is Rs. 420. The simple interest on the same sum at the same rate and for the same time will be:

- (a) Rs. 350 (b) Rs. 375
(c) Rs. 380 (d) Rs. 400

Sol. (d) Rate = $10\% = \frac{1}{10}$,

$$\text{Time} = 2 \text{ years}$$

$$\therefore \text{let sum} = (10)^2 = \text{Rs. } 100$$

$$\therefore \text{SI (for 2 years)} = 2A$$

$$\text{And CI (for 2 years)} = 2A + B$$

$$= 2(10\% \text{ of } 100) + 10\% \text{ of } A$$

$$= 2 \times 10 + 10\% \text{ of } 10$$

$$= 21$$

$$\text{But the given, CI} = \text{Rs. } 420$$

$$\text{i.e. } 21 \text{ Units} \longrightarrow 420$$

$$\therefore 1 \text{ Unit} \longrightarrow \frac{420}{21} = 20$$

$$\therefore 20 \text{ Units} \longrightarrow 20 \times 20 = 400$$

$$(\therefore A = 10 \Rightarrow 2A = 20)$$

$$\text{i.e. Required SI} = 2A = \text{Rs. } 400$$

Alternatively

Go through options.

96. If the difference between the compound interest, compounded every six months, and the simple interest on a certain sum of money at the rate of 12% per annum for one year is Rs. 36, the sum is :

- (a) Rs. 10,000 (b) Rs. 12,000
(c) Rs. 15,000 (d) Rs. 9,000

Sol. (c) Let sum = Rs. 100

$$\therefore \text{SI for 1 year at } 12\% \text{ per annum} = \text{Rs. } 12$$

$$\therefore \text{CI is compounded half yearly,}$$

$$\therefore \text{CI for 2 years}$$

$$\begin{array}{c} 100 \\ \swarrow 6\% \quad \searrow 6\% \\ 6 \quad 6 \end{array} \therefore \text{CI} = 12.36$$

$$\begin{array}{c} 6 \\ \searrow 6\% \\ .36 \end{array}$$

$$\text{i.e. CI} - \text{SI} = 0.36$$

$$\text{But the given difference} = \text{Rs. } 36$$

$$\text{i.e. } 0.36 \text{ Units} \longrightarrow 36$$

$$\therefore 1 \text{ Unit} \longrightarrow \frac{36}{0.36} = 100$$

$$\therefore 100 \text{ Units} \longrightarrow 100 \times 100 = 10,000$$

$$\text{i.e. Sum} = \text{Rs. } 10,000$$

97. A sum of money invested at compound interest amounts to Rs. 650 at the end of first year and Rs. 676 at the end of second year. The sum of money is:

- (a) Rs. 600 (b) Rs. 540
(c) Rs. 625 (d) Rs. 560

Sol. (c) Let sum = Rs. P

$$\therefore \text{According to the question,}$$

$$P \xrightarrow{\text{in 1 yr}} \text{Rs. } 650 \xrightarrow{\text{in 1 yr}} \text{Rs. } 676$$

$$\therefore \text{ratio will be same}$$

$$\therefore \frac{650}{P} = \frac{676}{650}$$

$$\Rightarrow P = \frac{650 \times 650}{676} = \text{Rs. } 625$$

98. If the compound interest on a certain sum for 2 years at 3% per annum is Rs. 101.50, then the simple interest on the same sum at the same rate and for the same time will be:

- (a) Rs. 90.00 (b) Rs. 95.50
(c) Rs. 100.00 (d) Rs. 98.25

Sol. (c) Let sum = Rs. 100

$$\begin{array}{c} 100 \\ \swarrow 3\% \quad \searrow 3\% \\ \text{I yr} \quad \text{II yr} \\ 3 \quad 3 \end{array}$$

$$\begin{array}{c} 3\% \\ \searrow \\ 0.09 \end{array}$$

$$\therefore \text{SI for 2 yrs} = 3 + 3 = \text{Rs. } 6$$

$$\& \text{ CI for 2 yrs} = 6 + 0.09 = \text{Rs. } 6.09$$

$$\text{but the given CI} = \text{Rs. } 101.50$$

$$\text{i.e. } 6.09 \text{ Units} \longrightarrow 101.50$$

$$\therefore 1 \text{ Unit} \longrightarrow \frac{101.50}{6.09}$$

$$\therefore 6 \text{ Units} \longrightarrow \frac{101.50}{6.09} \times 6 = 100$$

$$\text{i.e. SI for 2 yrs.} = \text{Rs. } 100$$

99. On a certain sum of money the compound interest for 2 years is Rs. 282.15 and the simple interest for the same period of time is Rs. 270. The rate of interest per annum is:

- (a) 6.07% (b) 10%
(c) 9% (d) 12.15%

Sol. (c) As we know, for 2 years

$$\begin{array}{c} P \\ \swarrow \quad \searrow \\ A \quad A \\ \searrow \quad \swarrow \\ B \end{array}$$

$$\text{here, } 2A = 270 \Rightarrow A = 135$$

$$\& 2A + B = 282.15 \Rightarrow B = 12.15$$

$$\therefore \text{Required rate} = \frac{B}{A} \times 100$$

$$= \frac{12.15}{135} \times 100 = 9\%$$

100. If the compound interest on a

sum for 2 years at $12\frac{1}{2}\%$ per

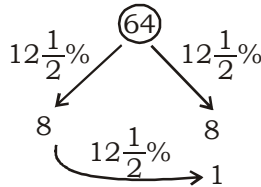
annum is Rs. 510, the simple interest on the same sum at the same rate for the same period of time is :

- (a) Rs. 400 (b) Rs. 480
(c) Rs. 450 (d) Rs. 460

Sol. (b) Rate = $12\frac{1}{2}\% = \frac{1}{8}$

$$\& \text{Time} = 2 \text{ yrs}$$

$$\therefore \text{Let sum} = (8)^2 = \text{Rs. } 64$$



$$CI = 2A + B = 8 + 8 + 1 = 17$$

But the given CI = Rs. 510

$$\text{i.e. } 17 \text{ Units} \longrightarrow 510$$

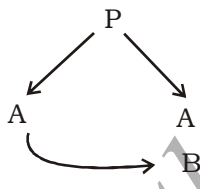
$$\Rightarrow 16 \text{ Units} \longrightarrow \frac{510}{17} \times 16 = 480$$

i.e., the required SI = Rs. 480

101. The compound interest on a certain sum of money at a certain rate for 2 years is Rs. 40.80 and the simple interest on the same sum is Rs. 40 at the same rate and for the same time. The rate of interest is:

- (a) 2% per annum
(b) 3% per annum
(c) 4% per annum
(d) 5% per annum

Sol. (c) As we know, for 2 yrs,



$$SI = 2A = 40 \Rightarrow A = \text{Rs. } 20$$

$$\& CI = 2A + B = 40.80$$

$$\Rightarrow B = \text{Rs. } 0.80$$

$$\therefore \text{Rate \%} = \frac{0.80}{20} \times 100 = 4\%$$

102. A money-lender borrows money at 4% per annum and pays the interest at the end of the year. He lends it at 6% per annum compound interest compounded half yearly and receives the interest at the end of the year. In this way, he gains Rs.

104.50 a year. The amount of money he borrows, is :

- (a) Rs. 6,000 (b) Rs. 5,500
(c) Rs. 5,000 (d) Rs. 4,500

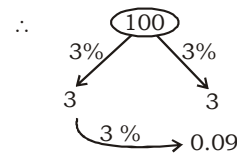
Sol. (c) Let the amount for money borrows = Rs. 100

Case - I : Interest is SI

$$\therefore \text{Required interest} = 4\% \text{ of } 100 = \text{Rs. } 4$$

Case - II : CI is compounded half yearly

$$\therefore \text{Rate} = \frac{1}{2} \times 6 = 3\% \text{ \& Time} \\ = 2 \times 1 = 2 \text{ yrs}$$



$$\text{i.e. } CI = 6.09$$

$$\therefore CI - SI = 6.09 - 4.0 = \text{Rs. } 2.09 \\ \text{but the given difference} = \text{Rs. } 104.50$$

$$\text{i.e. } 2.09 \text{ Units} \longrightarrow 104.50$$

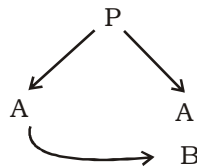
$$\Rightarrow 100 \text{ Units} \longrightarrow \frac{104.50}{2.09} \times 100 = 5000$$

i.e. the required amount of money = Rs. 5,000

103. At a certain rate per annum, the simple interest on a sum of money for one year is Rs. 260 and the compound interest on the same sum for two years is Rs. 540.80. The rate of interest per annum is :

- (a) 4 % (b) 6 %
(c) 8 % (d) 10 %

Sol. (c) As we know, for 2 years



$$\text{Given } A = 260$$

$$\& 2A + B = 540.80$$

$$\Rightarrow B = 20.80$$

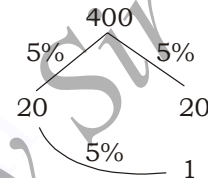
$$\therefore \text{Rate \%} = \frac{B}{A} \times 100$$

$$= \frac{20.8}{260} \times 100 = 8\%$$

104. The compound interest on a certain sum of money at 5% per annum for 2 years is Rs. 246. The simple interest on the same sum for 3 years at 6 % per annum is :

- (a) Rs. 435 (b) Rs. 450
(c) Rs. 430 (d) Rs. 432

Sol. (d) Let P = 400



$$2A + B = 20 + 20 + 1 = 41$$

But, CI = 246

$$\therefore 41 \text{ Units} = 246$$

$$\therefore 1 \text{ Unit} = \frac{246}{41}$$

$$\therefore 400 \text{ Units} = \frac{246}{41} \times 400 \\ = \text{Rs. } 2400$$

Now,

$$S.I. = \frac{2400 \times 3 \times 6}{100} = \text{Rs. } 432$$

105. The simple interest and compound interest (compounded annually) on a certain sum of money with a given rate for a period of 2 years are Rs. 900 and Rs. 954 respectively. The sum of money is :

- (a) Rs. 3700 (b) Rs. 3650
(c) Rs. 3850 (d) Rs. 3750

Sol. (d) 2 years SI = 900

$$\therefore 1 \text{ year SI} = 450$$

$$\therefore CI - SI = 954 - 900 = 54$$

$$R\% = \frac{54}{450} \times 100 = 12\%$$

$$\therefore 12\% = 1 \text{ year SI rate} \\ 12\% = 450$$

$$(\text{Sum}) 100\% = \frac{450}{12} \times 100 \\ = \text{Rs. } 3750$$

106. On a certain sum of money lent out at 16% p.a., the difference between the compound interest for 1 year, payable half yearly, and the simple interest for 1 year is Rs. 56. The sum is :



New time is 2 T

$$= 2 \times 1 = 2$$

$\therefore$ SI of one year = 16%

$\therefore$ CI of 2 half year

$$= 8 + 8 + \frac{8 \times 8}{100}$$

$$= 16.64\%$$

$$CI - SI = 16.64 - 16 = 0.64\%$$

$$0.64 = 56$$

According to the question,

$$(P)100\% = \frac{56}{0.64} \times 100$$

$$= \text{Rs. } 8750$$

(a) Rs. 1080 (b) Rs. 7805

(c) Rs. 8750 (d) Rs. 5780

Sol. (c) In such case of half year rate becomes half and time becomes two times.

$$\text{New rate} = \frac{16}{2} = 8\% \text{ and}$$

Exercise

1. A sum of ₹ 2500 is invested at 10% compound interest per annum, what will be the amount after two years ?
(a) ₹ 3000 (b) ₹ 3200
(c) ₹ 3025 (d) ₹ 4000
2. Find the compound interest on a sum of ₹ 4,000 invested for a period of 3 years at the rate of 5% per annum -
(a) ₹ 600 (b) ₹ 642.50
(c) ₹ 630.50 (d) ₹ 638.50
3. Find the compound interest on ₹ 16000 for 9 months at 20% per annum, the interest being payable quarterly ?
(a) ₹ 2512 (b) ₹ 2322
(c) ₹ 5222 (d) ₹ 2522
4. Rakesh Yadav lends ₹ 9000 at compound interest rate of 15% per annum for $2\frac{3}{5}$ years. Find the amount he will get after the time limit.
(a) 12980 (approx)
(b) 12974.70 (approx)
5. An amount becomes $2\frac{1}{4}$ times of itself in 2 years at compound interest. Find the interest rate per annum
(a) 25% (b) 75%
(c) 50% (d) 125%
6. An amount becomes ₹ 24000 in 4 years and ₹ 27783 in 7 years at compound interest. Find the annual compound interest rate.
(a) 7.5% (b) 5%
(c) 6% (d) 10%
7. In how many years an amount of ₹ 1512 will grow to ₹ 2401 at compound interest rate of $16\frac{2}{3}\%$ per annum?
(a) 2.5 years (b) 2 years
(c) 3 years (d) 3.5 years
8. What sum will become ₹ 5618 at CI rate of 6% per annum in 2 years?
(a) ₹ 4000 (b) ₹ 5000
(c) ₹ 4500 (d) ₹ 4800
9. The cost of a machine decreases by 4% every year. If after three years its cost remains ₹ 70778.88, find its initial cost.
(a) ₹ 90,000 (b) ₹ 80,000
(c) ₹ 85,000 (d) ₹ 1,00,000
10. The amount becomes 3 times of itself in 6 years at compound interest. In how many years will it become 81 times of itself?
(a) 36 years (b) 54 years
(c) 9 years (d) 24 years
11. Bhuvnesh lends ₹ 12000 on the condition that he will charge 5% per annum for the first year, 6% per annum for the next two years and 10% per annum for the next three years. Find the amount he will receive as compound interest after the completion of the time period.
(a) ₹ 6500 (approx.)
(b) ₹ 6800 (approx.)
(c) ₹ 6834.40 (approx.)
(d) ₹ 6843.45 (approx.)
12. The simple interest on certain amount at 10% per annum for 2 years is ₹ 400. Find the compound interest on the same amount at the same rate for the same period of time
(a) ₹ 421 (b) ₹ 420
(c) ₹ 420.50 (d) ₹ 422.50



13. The simple interest on a certain sum for two years is ₹ 600 while the compound interest is ₹ 900. Find the sum and rate of interest per annum
(a) ₹ 3000, 10%
(b) ₹ 1500, 20%
(c) ₹ 300, 100%
(d) ₹ 600, 50%
14. Find the amount at which the difference between simple interest and compound interest at 5% per annum for 3 years is ₹ 91.50.
(a) ₹ 10,000 (b) ₹ 15,000
(c) ₹ 12,000 (d) ₹ 8,000
15. Find the amount at which the compound interest at 10% per annum for 3 years will be ₹ 993
(a) ₹ 3000 (b) ₹ 5000
(c) ₹ 3500 (d) ₹ 3600
16. An amount becomes ₹ 12000 in 6 years and ₹ 18000 in 12 years at compound interest. Find the amount
(a) ₹ 10,000 (b) ₹ 9,000
(c) ₹ 8,000 (d) None of these
17. Rakesh Yadav borrows a sum at 3% per annum Compounded yearly and lends it at 5% per annum compounded half yearly. In this way he earns a profit of ₹ 1320 at the end of the year. Find the sum he borrowed
(a) ₹ 60,000 (b) ₹ 65,000
(c) ₹ 64,000 (d) ₹ 50,000
18. A certain amount becomes ₹ 5832 in two years and ₹ 6298.56 in three years at compound interest. Find the rate of interest and the amount
(a) 10%, ₹ 4800
(b) 8%, ₹ 5000
(c) 12%, ₹ 4500
(d) can't be determined
19. A man bought a car and paid ₹ 12000 as down payment. He told the seller that he would pay ₹13050 after 1 years and ₹ 22680 after two years at $12\frac{1}{2}\%$ compound interest per annum. At what amount did he purchase the car ?
(a) ₹ 42,000 (b) ₹ 40,000
(c) ₹ 41,520 (d) ₹ 42,510
20. A sum of ₹ 19515 was divided into two parts and was lent to A and B for 7 years and 9 years respectively. If the rate of compound interest be 4% per annum and after the completion of time they paid equal amount, find the sum lent to A and B.
(a) A ₹ 10140, B ₹ 9375
(b) A ₹ 10000, B ₹ 9515
(c) A ₹ 10515, B ₹ 9000
(d) None of these
21. A's amount increases $\frac{441}{400}$ times of B's amount. B spends his amount at 9% per annum for two years. At what rate should A spend his amount so that after two years their amounts may become equal ?
(a) $12\frac{1}{2}\%$ (b) $8\frac{1}{3}\%$
(c) $13\frac{1}{3}\%$ (d) $6\frac{1}{4}\%$
22. A certain sum was lent at compound interest of 5% per annum for 3 years. Interest of third year is ₹ 26.25 more than that of second year. Find the total interest at the end of three years and also find the certain sum ?
(a) ₹ 1576.52, ₹ 12000
(b) ₹ 1576.25, ₹ 12000
(c) ₹ 1576.25, ₹ 10000
(d) None of these
23. Find the amount that will become ₹ 28119 in three years at compound interest while the interest rate for the first year is 3%, for the second year is 4% and for the third year is 5% per annum
(a) ₹ 20,000 (b) ₹ 24,000
(c) ₹ 25,000 (d) ₹ 24,500
24. A and B borrow equal amount at simple interest and compound interest respectively at the rate of 5% per annum After 3 years B pays ₹ 152.50 more than that of A. Find the total amount they borrowed individually and also find the interest paid by each of them?
(a) ₹ 25000, A ₹ 3100, B ₹ 3252.50
(b) ₹ 20,000, A ₹ 2847.50, B ₹ 3000
(c) ₹ 24,000, A ₹ 3100, B ₹ 3252.50
(d) ₹ 20,000, A ₹ 3000, B ₹ 3152.50
25. Radha invested a certain sum in a bank at 8% per annum, and at the end of year she received the interest. Bank lends that sum to an industry at 10% per annum compounded half yearly and receive the interest at the end of the year. In this way bank earns ₹ 675 profit. Find the sum that was invested by Radha in the bank ?
(a) ₹ 25000 (b) ₹ 28000
(c) ₹ 30000 (d) ₹ 32500
26. The population of a city in 1973 was x, in 1982 was y and in 1991 was z. If in these years population increment rate be the same, find the relation between x,y and z.
(a) $x^2 = xz$ (b) $z^2 = xy$
(c) $y^2 = xz$ (d) $x = z\sqrt{y}$
27. A merchant bought a house and a car for ₹1,25000 and ₹ 1,80,000 respectively. If the value of the house increases by 20% per annum and the value of the car decreases by 10% per annum then find the profit or loss occurred to the merchant after 2 years ?
(a) ₹ 20,800 loss
(b) ₹ 20,800 profit
(c) ₹ 28,000 loss
(d) ₹ 28,000 profit
28. Rakesh Yadav took a loan of ₹ 6300 from a bank and decided to pay back it in three equal installments at 10% compound interest per annum. Find the amount of each installment.
(a) ₹ 2500 (b) ₹ 2533.32
(c) ₹ 2532.33 (d) ₹ 2534.33



29. The cost of a T.V. is ₹ 12,000. A customer bought it after paying ₹ 4000 as down payment and he promises to pay the rest amount in three equal installment at 5% compound interest per annum. Find the amount of each installment paid by him ?
 (a) ₹ 2973.66 (approx.)
 (b) ₹ 2937.66 (approx.)
 (c) ₹ 2973.33 (approx.)
 (d) ₹ 2937.33 (approx.)
30. I took loan of some amount at compound interest rate of 10% per annum. I decided to pay it in three equal installments. If each installment amounts to be ₹ 2662, find how much money I borrowed ?
 (a) ₹ 6000 (b) ₹ 6500
 (c) ₹ 6250 (d) ₹ 6620
31. A sum of ₹ 1280 was lent out at compound interest rate of $6\frac{1}{4}\%$ per annum for 2 year. Find the amount of interest after 2 years?
 (a) ₹ 161 (b) ₹ 165
 (c) ₹ 164 (d) ₹ 163
32. ₹ 7500 were lent out at 10% compound interest per annum for 3 years. Find the total amount after 3 years also find the amount of interest.
 (a) ₹ 9988.50, ₹ 2486.50
 (b) ₹ 9982.50, ₹ 2482.50
 (c) ₹ 9987.50, ₹ 2487.50
 (d) None of these
33. ₹ 6000 was lent out at 10% per annum for $1\frac{1}{2}$ years. Find the amount of interest if the interest being payable compounded half yearly ?
 (a) ₹ 954.75 (b) ₹ 945.57
 (c) ₹ 945.75 (d) ₹ 954.57
34. I lent ₹ 2500 to Rakesh at 24% per annum compound interest for 15 months. If the interest is compounded after every 5 months then find the amount that Rakesh will pay back to me.
 (a) ₹ 3326.50 (b) ₹ 3327.50
 (c) ₹ 3328.50 (d) ₹ 3329.50
35. A trader started a business after investing certain amount. After 3 years he earns ₹ 4340 as compound interest at $12\frac{1}{2}\%$ per annum compound interest. How much money he invested initially ?
 (a) ₹ 10,420 (b) ₹ 10,402
 (c) ₹ 10,240 (d) ₹ 10,204
36. A certain amount becomes ₹ 4630.50 in 3 years at 5% per annum compound interest, find the amount.
 (a) ₹ 4400 (b) ₹ 4200
 (c) ₹ 4000 (d) ₹ 4110
37. The compound interest on a certain amount for three years at 6.25% per annum is ₹ 4085. Find the amount.
 (a) ₹ 20,840 (b) ₹ 20,480
 (c) ₹ 20,804 (d) ₹ 20,408
38. Bhuvnesh bought a car and its value depreciated at 12.5% per annum. After two years its value reduced to ₹ 147000. Find the value of the car at the time he bought it.
 (a) ₹ 1,96,000 (b) ₹ 1,90,000
 (c) ₹ 1,92,000 (d) None of these
39. A certain amount becomes two times of itself in 5 years at compound interest. In how many years it will become 16 times of itself ?
 (a) 15 years (b) 16 years
 (c) 25 years (d) 20 years
40. Radha lends ₹ 15625 to her friend for 3 years. Her friend returns all the money with a watch costing ₹ 550, after the completion of time period. If the rate of compound interest be 4% per annum, find the amount that her friend paid back in cash.
 (a) ₹ 17022 (b) ₹ 17028
 (c) ₹ 17026 (d) ₹ 17030
41. A merchant gives a loan at different rates for different years. The rate of compound interest for the first two years is 10% per annum, for next three years is 5% per annum, for the last year is 6.25% per annum respectively. A poor man took a loan of ₹ 6400 from him and paid after the completion of the time period. How much the poor man paid ?
 (a) ₹ 1000 (Approx)
 (b) ₹ 9550 (Approx)
 (c) ₹ 9375 (Approx)
 (d) ₹ 9525 (Approx)
42. In a factory, the annual salary of an officer is ₹ 1,20,000. If his salary reduces at $2\frac{1}{2}\%$ per annum then what will be his salary after 3 years?
 (a) ₹ 1,22,123 (Approx)
 (b) ₹ 1,11,131 (Approx)
 (c) ₹ 1,22,223 (Approx)
 (d) ₹ 1,11,223 (Approx)
43. A certain amount becomes ₹ 15730 in two years and ₹ 17303 in three years at compound interest. Find the certain amount and also find the rate of interest per annum.
 (a) ₹ 12000, 12.5%
 (b) ₹ 13000, 10%
 (c) ₹ 15000, 6.5%
 (d) None of there.
44. Mohan borrows some money from Sohan at 20% per annum and he immediately lends that money to Kavita at the same rate of interest payable compounded half yearly. If at the end of the year he made a profit of ₹ 1240.50 then find how much money Mohan borrowed from Sohan?
 (a) ₹ 124050 (b) ₹ 60,000
 (c) ₹ 96,000 (d) ₹ 72,000
45. If a certain amount the difference between simple interest and compound interest



- at $6\frac{2}{3}\%$ per annum for 3 years is ₹ 460, find the amount.
 (a) ₹ 33,250 (b) ₹ 33,000
 (c) ₹ 33,500 (d) ₹ 33,750
46. The population of a city increased by 10% in 1996 but due to some natural disaster, in 1997 it decreased by 5%. Again in 1998 it increased by 12%. If in the end of the year 1998 the population of the city was 46816, find the population of the city in the beginning of 1996.
 (a) ₹ 40,400 (b) ₹ 44,000
 (c) ₹ 40,000 (d) ₹ 41,100
47. The simple interest of certain amount for two years at 5% per annum in ₹ 820. At another, amount the compound interest for the same period of time at the same rate is also ₹ 820. Find the difference between the two amounts.
 (a) ₹ 200 (b) ₹ 218
 (c) ₹ 196 (d) ₹ 219
48. I bought a piece of land and in its value there was an increment of 20% per annum for 2 years but a decrement of 25% in the third year. And now I have to sell it for ₹ 1,08,000. At what amount did I buy it?
 (a) ₹ 1,20,000 (b) ₹ 1,25,000
 (c) ₹ 1,00,000 (d) ₹ 90,000
49. A father deposited ₹ 22360 in the account of his two sons Rakesh and Bhuvnesh. At the time of deposition, the ages of two sons were 14 years, and 17 years respectively. He put a condition to the bank official that his both children must get equal amount when they will be 30 years old. If the rate of compound interest be $16\frac{2}{3}\%$ per annum. Find the amount deposited in each account.
 (a) ₹ 8640, ₹ 12720
 (b) ₹ 8460, ₹ 13720
 (c) ₹ 8640, ₹ 13720
 (d) ₹ 8640, ₹ 12270
50. A certain sum was lent out at rate of 10% per annum on simple and compound interest. If at the end of third year the sum of both types of interests be ₹ 4420, then find the certain sum.
 (a) ₹ 21,200 (b) ₹ 20,000
 (c) ₹ 18,000 (d) ₹ 24,000
51. The ratio of two amounts is 4 : 5. If they are lent out at compound interest for 2 years and 1 year respectively, then the equal amount is received. Find the rate of interest per annum.
 (a) 20% (b) $16\frac{2}{3}\%$
 (c) 25%
 (d) Data insufficient
52. A merchant bought a house and a car for ₹ 5,00,000 and ₹ 7,00,000 respectively. If the value of house increases by 12% per annum and the value of car depreciates by 15% per annum then what will be his profit or loss after three years.
 (a) ₹ 68417.23 (Loss)
 (b) ₹ 67648.50 (Loss)
 (c) ₹ 68417.23 (Profit)
 (d) ₹ 67648.50 (Profit)
53. A man borrows ₹ 9000 at 10% compound interest per annum. After the end of each year he returns ₹ 3000. At the end of third year how much money should he returns to settle all his debt?
 (a) ₹ 5050 (b) ₹ 5049
 (c) ₹ 5048 (d) ₹ 5051
54. Sita invested ₹ 10,000 at 16% per annum in a private company. Her sister Harsha invested an equal amount at 15% per annum in another company but in this company the interest is payable compounded half yearly. Find after $1\frac{1}{2}$ year who will get more interest?
 (a) Sita
 (b) Harsha
 (c) Both equal
 (d) Can't be determined
55. A certain amount was lent out at 10% compound interest per annum for $1\frac{1}{2}$ years. But if the interest is compounded half yearly, ₹ 36.75 more is gained. Find the amount.
 (a) ₹ 20,000 (b) ₹ 14,000
 (c) ₹ 18,000 (d) ₹ 16,000
56. A sum was lent out at 5% per annum for three years and the interest being compounded annually. If the total compound interest is ₹ 2522. Find the sum.
 (a) ₹ 20,000 (b) ₹ 14,000
 (c) ₹ 18,000 (d) ₹ 16,000
57. Find the amount which will become ₹ 2809 in 2 years at compound interest rate of 6% per annum.
 (a) ₹ 2500 (b) ₹ 2498
 (c) ₹ 2497.97 (d) ₹ 2498.79
58. 22830 was divided into two parts and given to A and B and were told that they should spend at 5% per annum. A used it for 9 years and B used it for 11 years and then they left with equal amount. Find the money given to each initially.
 (a) ₹ 10,830, ₹ 12000
 (b) ₹ 11,720, ₹ 16000
 (c) ₹ 9870, ₹ 10,000
 (d) None of these
59. Sita invested some amount for 3 years and bought a share of a company. Company promised her to give a return of simple interest at $6\frac{1}{4}\%$ per annum. Her sister Geeta invested the



same amount in another company but her company gives her the compound interest at same rate. If after 3 year Sita's sister got ₹ 717.77343 more than Sita, find the amount invested by each and also find the interest received by Sita.

- (a) ₹ 50,000, ₹ 10275
(b) ₹ 60,000, ₹ 11968
(c) ₹ 48,000, ₹ 9600
(d) None of these
60. Anjali deposited some amount in UTI bank at 10% per annum and she hopes that the bank will give her some interest. Bank lends this amount to a company at 12% per annum but interest compounded half yearly. After one year bank pays interest to Anjali and makes a profit of ₹ 1888. Find the amount that Anjali deposited in the bank-
- (a) ₹ 96,000 (b) ₹ 68,000
(c) ₹ 80,000 (d) ₹ 88,000
61. A certain sum was lent out at compound interest rate of 10% per annum. If the difference between the interest of third year and that of second year is ₹ 990, then find the certain sum and the total interest for 4 years.
- (a) ₹ 90,000, ₹ 41,769
(b) ₹ 1,00,000, ₹ 41,769
(c) ₹ 1,00,000, ₹ 41,679
(d) ₹ 1,00,000, ₹ 41,769
62. Find the amount that will become ₹ 109771.20 in 5 year at compound interest, if the rate for the first year is 5%, for next two years be 10% and for the last two years be 20% per annum.
- (a) ₹ 50,000 (b) ₹ 60,000
(c) ₹ 80,000
(d) None of these
63. A's salary is $\frac{37}{27}$ times more than the salary of B. B spends his salary at 10% per annum. At what rate should A spend his salary so that after 3 years they are left with the same amount while they spend on compound interest basis ?
- (a) $33\frac{1}{3}\%$ (b) $33\frac{1}{2}\%$
(c) $31\frac{1}{4}\%$ (d) None of these
64. Rakesh Yadav deposited a certain sum in the beginning of every year and bank gives 10% compound interest on the sum. At the end of third year the amount in his account is ₹ 7282. Find how much amount he deposited in each year.
- (a) ₹ 2000 (b) ₹ 4000
(c) ₹ 2135 (d) ₹ 2200
65. A certain sum is deposited in the bank at 10% compound interest for 2 years. After 2 years, ₹ 2050 is paid from the amount received and the remaining amount is left for the third year. The interest of third year is $\frac{8}{21}$ times of the interest of first two years. Find the sum deposited in the bank initially.
- (a) ₹ 7000 (b) ₹ 5000
(c) ₹ 8000 (d) ₹ 10000
66. Bhuvnesh bought a scooter on the condition that he would pay ₹ 12000 instantly and ₹ 1680 after one year and ₹ 5292 after two years. If the payment is at 5% compound interest, then what was the cost price of scooter.
- (a) ₹ 18,400 (b) ₹ 18,000
(c) ₹ 20,000 (d) ₹ 21,400
67. A sum of ₹ 30500 is divided into two parts and first part was lent out at 20% for 3 years and the other at the same rate for 5 years. If the received total amount is same in both, then find the divided parts of sum.
- (a) ₹ 20000, ₹ 10500
(b) ₹ 18000, ₹ 12500
(c) ₹ 16000, ₹ 14500
(d) ₹ 18000, ₹ 10500
68. A sum of ₹ 25220 is divided into three parts and lent out for 2 years, 3 years and 4 years respectively. If the rate of compound interest be 5% and the amount of each part become same after the completion of time in each case, find the divided parts of the sum.
- (a) ₹ 8800, ₹ 8450, ₹ 8000
(b) ₹ 8880, ₹ 8400, ₹ 8100
(c) ₹ 8820, ₹ 8400, ₹ 8000
(d) None of these
69. A man borrowed ₹ 2522 at 5% compound interest per annum. If he paid back it in three equal installment. Find the amount of each annual installment.
- (a) ₹ 927 (b) ₹ 927.10
(c) ₹ 926.10 (d) ₹ 930
70. Radha took a loan at 10% per annum compound interest and paid back the money in three equal installment of each ₹ 5324. How much rupees did she borrow ?
- (a) ₹ 13420 (b) ₹ 13240
(c) ₹ 12240 (d) ₹ 12420
71. A sewing machine costs ₹ 20,000. A customer bought it at the down payment of ₹ 5000 and paid the remaining amount in three equal installments. If the rate of compound interest be $12\frac{1}{2}\%$ per annum, find the amount of each installment-
- (a) ₹ 7001 (b) ₹ 6992
(c) ₹ 6997.8 (d) ₹ 6299
72. A loan of ₹ 34,370 is paid back in three annual installments. Second installment is twice of first and third is three-fourth of second installment. If for the remaining time, the rate of



- compound interest be 10% per annum on each installment, find all three installments -
- (a) ₹ 6,000, ₹ 12,000, ₹ 9000
(b) ₹ 8,000, ₹ 16000, ₹ 12000
(c) ₹ 7,000, ₹ 14000, ₹ 10500
(d) None of these
73. ₹ 2100 is lent at compound interest of 5% per annum for 2 years. Find the amount after two years.
(a) ₹ 2300 (b) ₹ 2315.25
(c) ₹ 2310 (d) ₹ 2320
74. ₹ 1694 are repaid after two years at compound interest. Which of the following is the value of the principal and the rate ?
(a) ₹ 1200, 20%
(b) ₹ 1300, 15%
(c) ₹ 1400, 10%
(d) ₹ 1500, 12%
75. Find the difference between the simple and the compound interest at 5% per annum for 2 years on a principal of ₹ 2000.
(a) 5 (b) 105
(c) 4.5 (d) 5.5
76. What is the difference between compound interest and simple interest for the sum 20000 over a 2 years time period if the compound interest is calculated at 20% and simple interest is calculated at 23% ?
(a) ₹ 400 (b) ₹ 460
(c) ₹ 440 (d) ₹ 450
77. Find the compound interest on ₹ 1000 at the rate of 20% per annum for 18 months when interest is compounded half-yearly.
(a) ₹ 331 (b) ₹ 1331
(c) ₹ 320 (d) ₹ 325
78. Find the principal if the interest is compounded at the rate of 10% per annum for two years is ₹ 420.
(a) ₹ 2000 (b) ₹ 2200
(c) ₹ 1000 (d) ₹ 1100
79. Find the principal if compound interest is charged on the principal at the rate of $16\frac{2}{3}\%$ per annum for two years and the sum becomes ₹ 196.
(a) ₹ 140 (b) ₹ 154
(c) ₹ 150 (d) ₹ 144
80. The PNB lends 1331 to Rakesh Yadav Readers Publication at a compound interest and got 1728 after three years. What is the rate of interest charged if the interest is compounded annually?
(a) 11% (b) 9.09%
(c) 12% (d) 8.33%
81. In what time will 3300 become 3399 at 6% per annum interest compounded half-yearly?
(a) 6 months (b) 1 year
(c) $1\frac{1}{2}$ years (d) 3 months
82. At what percentage per annum, will ₹ 10,000 amount to 17,280 in three years ? (Compound Interest being reckoned)
(a) 20% (b) 14%
(c) 24% (d) 11%
83. Rakesh Yadav deposited ₹ 8000 in Union Bank, which pays him 12% interest per annum compounded quarterly. What is the amount that he receives after 15 months ?
(a) 9274.2 (b) 9228.8
(c) 9314.3 (d) 9338.8
84. In a particular place, Vulture's population is decreasing at the certain rate of interest. If at present the Vulture's population is ₹ 29,160 and decreased population of second and Third year are 10 : 9. Then find the population of Vulture in the third year?
(a) 30,000 (b) 35,000
(c) 40,000 (d) 50,000
85. Rakesh Yadav makes a deposit of ₹ 50,000 in the Punjab National Bank in a period of $2\frac{1}{2}$ years. If the rate of interest is 12% per annum compounded half-yearly, find what amount will he get after the given period.
(a) 66,911.27 (b) 66,123.34
(c) 67,925.95 (d) 65,550.8
86. Bhuvnesh makes a deposit of 100,000 in Syndicate Bank for a period of 2 years. If the rate of interest be 12% per annum compounded half-yearly, what amount will he get after 2 years ?
(a) 122,247.89
(b) 125,436.79
(c) 126,247.69
(d) 122,436.89
87. The difference between simple and compound interest on a sum of money for two years at 5% per annum is ₹ 25. What is the sum ?
(a) ₹ 50000 (b) ₹ 13000
(c) ₹ 25000 (d) ₹ 10000
88. A sum of money is borrowed and paid back in two equal annual installments of ₹ 882, allowing 5% compound interest. The sum borrowed was
(a) ₹ 1640 (b) ₹ 1680
(c) ₹ 1620 (d) ₹ 1700
89. If the difference between the simple interest and compound interest on some principal amount at 20% per annum for 3 years is ₹ 48, then the principle amount must be
(a) ₹ 550 (b) ₹ 500
(c) ₹ 375 (d) ₹ 400
90. A sum of money becomes double of itself in 5 years. In how many years will it become four fold (if interest is compound) ?
(a) 15 (b) 10
(c) 20 (d) 12



91. A sum of money placed at compound interest doubles itself in 3 years. In how many years will it amount to 8 times itself ?
(a) 9 years (b) 8 years
(c) 27 years (d) 7 years
92. If the compound interest on a certain sum for 2 years is ₹ 21. What could be the simple interest?
(a) ₹ 20 (b) ₹ 16
(c) ₹ 18 (d) ₹ 20.5
93. Divide 3903 between Rakesh Yadav and Bhuvnesh such that Rakesh' share at the end of 7 years is equal to Bhuvnesh' share at the end of 9 years at 4% p.a. rate of compound interest.
(a) Rakesh = ₹ 2028, Bhuvnesh = ₹ 1875
(b) Rakesh = ₹ 2008, Bhuvnesh = ₹ 1000
(c) Rakesh = ₹ 2902, Bhuvnesh = ₹ 1001
(d) Rakesh = ₹ 2600, Bhuvnesh = ₹ 1303
94. If the difference between compound and simple interest on a certain sum of money for 3 years at 2% p.a. is ₹ 604, what is the sum ?
(a) 5,00,000 (b) 4,50,000
(c) 5,10,000 (d) None of these
95. If the simple interest is 10.5% annual and compound interest is 10% annual, find the difference between the interests after 3 years on a sum of ₹ 1000.
(a) ₹ 15 (b) ₹ 12
(c) ₹ 16 (d) ₹ 11
96. A sum of ₹ 1000 after 3 year at compound interest becomes a certain amount that is equal to the amount that is the result of a 3 year depreciation from ₹ 1728. Find the difference between the rates of CI and depreciation. (Given the rate of CI is 10% p.a.). (Approximately)
(a) 3.33% (b) 0.66%
(c) $\frac{3}{5}\%$ (d) $\frac{5}{3}\%$
97. Find the compound interest on ₹ 64,000 for 1 year at the rate of 10% per annum compounded quarterly (to the nearest integer).
(a) ₹ 8215 (b) ₹ 8205
(c) ₹ 8185 (d) None of these
98. If a principal P becomes Q in 2 years when interest R% is compounded half-yearly. And if the same principal P becomes Q in 2 years when interest S% is compounded annually, then which of the following is true ?
(a) $R > S$ (b) $R = S$
(c) $R < S$ (d) $R \leq S$
99. Find the compound interest at the rate of 10% for 3 years on that principal which in 3 years at the rate of 10% per annum gives ₹ 300 as simple interest.
(a) ₹ 331 (b) ₹ 310
(c) ₹ 330 (d) ₹ 333
100. The difference between CI and SI for a certain sum of money at 10% per annum for 3 years is ₹ 620. Find the principal if it is known that the interest is compounded annually.
(a) ₹ 200,000 (b) ₹ 20,000
(c) ₹ 10,000 (d) ₹ 100,000
101. A sum of ₹ 8000 is borrowed at 5% p.a. compound interest and paid back in 3 equal annual installments. What is the amount of each installment ?
(a) ₹ 2937.67 (b) ₹ 3000
(c) ₹ 2037.67 (d) ₹ 2739.76
102. Find compound interest on ₹ 6750 at $6\frac{2}{3}\%$ per annum for 3 years.
(a) ₹ 1442 (b) ₹ 1432
(c) ₹ 1452 (d) None of these
103. Find the compound interest on ₹ 125000 at 8% per annum for 9 months, compounded quarterly.
(a) ₹ 7651 (b) ₹ 7641
(c) ₹ 7631 (d) None of these
104. What will be the compound interest on ₹ 9000 at 10% per annum for 2 year 4 months, compounded annually.
(a) ₹ 2253 (b) ₹ 2263
(c) ₹ 2200 (d) None of these
105. If the compound interest on a certain sum at 8% per annum for 2 years is ₹ 2080, find the simple interest for the same period.
(a) ₹ 2000 (b) ₹ 3000
(c) ₹ 4000 (d) None of these
106. In what time will ₹ 800 become ₹ 926.10 at 10% per annum interest compounded half yearly.
(a) $\frac{3}{2}$ years (b) $\frac{1}{2}$ years
(c) $\frac{5}{2}$ years (d) None of these
107. The simple interest on a sum at certain rate for 2 years is ₹ 160 and compound interest is ₹ 170. What is the rate percent per annum ?
(a) $12\frac{1}{2}\%$ (b) $8\frac{1}{3}\%$
(c) $11\frac{1}{9}\%$ (d) None of these
108. What will be the present value of payable ₹ 14580 after two years at 8% per annum compound interest ?
(a) ₹ 12500 (b) ₹ 11500
(c) ₹ 10500 (d) None of these
109. What will be the compound interest on ₹ 10000 for 3 years, when rate of interest for first year is 4%, for second year is 5% and for third year is 6% ?
(a) ₹ 1575.20 (b) ₹ 1570.20
(c) ₹ 1550.20 (d) None of these
110. What will be compound interest on ₹ 16000 at 20% per annum for 9 months, compounded quarterly ?
(a) ₹ 2522 (b) ₹ 2552
(c) ₹ 5225 (d) ₹ 5252



111. The compound interest on a certain sum at 15% per annum at the end of three years is ₹ 6500.52. What is the sum?
 (a) ₹ 12480 (b) ₹ 12840
 (c) ₹ 12400 (d) ₹ 12800
112. A sum of ₹ 12,000 deposited at compound interest becomes double after 5 years. After 20 years, it will become :
 (a) ₹ 144000 (b) ₹ 172000
 (c) ₹ 164000 (d) ₹ 192000
113. What annual payment will discharge a debt of ₹ 1025 due in 2 years at the rate of 5% compound interest.
 (a) ₹ 515.25 (b) ₹ 561.25
 (c) ₹ 516.25 (d) ₹ 551.25
114. A tree increases $\frac{1}{8}$ times per year in length. If present height of the tree is 64 cm, then what will be the height after two years ?
 (a) 72 cm (b) 90 cm
 (c) 81 cm (d) None of these
115. A sum of ₹ 400 would become ₹ 441 after 2 years at $r\%$ compound interest, find the value of ' r ':
 (a) 10% (b) 5%
 (c) 15% (d) 20%
116. At compound interest, if a certain sum of money doubles in n years, then the amount will be four fold in :
 (a) n^2 years (b) $2n^2$ years
 (c) $2n$ years (d) $4n$ years
117. ₹ 6000 amounts to ₹ 7986 in 3 years at CI. The rate of interest is :
 (a) 20% (b) 10%
 (c) 6% (d) 7.5%
118. The least number of complete years in which a sum of money put at 20%. CI will be more than doubled is:
 (a) 4 (b) 5
 (c) 6 (d) 8
119. The CI on ₹ 5000 for 3 years at 8% for first year, 10% for second year and 12% for third year will be:
 (a) ₹ 1750 (b) ₹ 1652.80
 (c) ₹ 1575 (d) ₹ 1685.20
120. A sum of ₹ 2400 deposited at CI, doubled after 5 year. After 20 years it will become :
 (a) ₹ 24000 (b) ₹ 38400
 (c) ₹ 19200 (d) can't be determined
121. A sum of 550 was taken as a loan. This is to be paid back in two equal annual installments. If the rate of interest be 20% per annum compounded annually, then the value of each installments is:
 (a) 300 (b) 360
 (c) 250 (d) None of these
122. The difference between simple and compound interest on ₹ 6000 for 1 years at 20% per annum reckoned half yearly is:
 (a) 120 (b) 60
 (c) 180 (d) 72
123. A certain sum amounts to ₹ 8988.8 in two year and to ₹ 9528.128 in three years, at compound interest per annum. What is the principal and rate of interest?
 (a) ₹ 12,000, 5%
 (b) ₹ 6,000, 8%
 (c) ₹ 8,000, 6%
 (d) ₹ 10,000, 8.5%
124. The compound interest and the simple interest for two years on a certain sum of money at a certain rate of interest are ₹ 2257.58, ₹ 2100 respectively. Find the principal and rate percent :
 (a) 6000, 7% (b) 7500, 8%
 (c) 14000, 10% (d) 7000, 15%
125. The compound interest on a certain sum at a certain rate of interest for the second year and third year is ₹ 21780 and ₹ 23958 respectively. What is the rate of interest ?
 (a) 6% (b) 12%
 (c) 10% (d) 15%
126. Bhuvnesh borrowed ₹ 800 at 10% rate of interest. He repaid ₹ 400 at the end of first year. What is the amount required to pay at the end of second year to discharge his loan which was calculated at compound interest ?
 (a) 420 (b) 440
 (c) 450 (d) 528
127. A Sonata watch is sold for ₹ 440 cash or for ₹ 200 cash down payment together with ₹ 244 to be paid after one month. Find the rate of interest charged in the installment scheme. :
 (a) 10% (b) 15%
 (c) 20% (d) 25%
128. A mobile phone is available for ₹ 600 or for 300 cash down payment together with ₹ 360 to be paid after two months. Find the rate of interest charged under this scheme:
 (a) 20% (b) 50%
 (c) 120% (d) None of these
129. Rakesh Yadav purchases a track suit for ₹ 2400 cash or for ₹ 1000 cash down payments and together with ₹ 1600 to be paid after one month. Find the rate of interest:
 (a) 75%
 (b) 120%
 (c) 50%
 (d) None of these
130. A sum of ₹ 390200 is to be paid back in three equal annual installments. How much is each installments, if the rate of interest charged is 4% per annum compounded annually?
 (a) ₹ 140608 (b) ₹ 120560
 (c) ₹ 10000 (d) ₹ 18000



131. Bhuvnesh borrowed a sum of money and return it in three equal quarterly installments of Rs.17576 each. Find the sum borrowed, if the rate of interest charged was 16% per annum compounded quarterly. Find also the total interest charged.
 (a) 46900 and 4700
 (b) 48775 and 3953
 (c) 68320 and 1200
 (d) None of these
132. Rakesh Yadav borrowed ₹ 10815, which is to be paid back in 3 equal half yearly installments. If the interest is compounded half yearly at $\frac{40}{3}\%$ per annum, how much is each installment?
 (a) 2048 (b) 3150
 (c) 4096 (d) 5052
133. Bhuvnesh borrowed some money on compound interest and returned it in three years in equal annual installments. If the rate of interest is 15% per annum and annual installments is ₹ 486680, find the sum borrowed :
 (a) 1112220 (b) 1111200
 (c) 1122000 (d) None of these
134. P and Q invest some amount under SI and CI respectively but for the same period at 6% per annum. Each gets a total amount of ₹ 65,000 at the end of 6 years. Which of the following is definitely true ?
 (i) Q's initial principal is less than that of P
 (ii) Q's initial principal is equal to that of P
 (iii) P's percentage earning is less than that of Q
 (a) (i) only
 (b) (ii) only
 (c) (iii) only
 (d) (i) and (iii) only
135. In the above (i.e., previous) problem, what is the ratio of P's final amount to that of Q, if P and Q invest the same amounts?
 (a) $(1.06)^6$
 (b) $\frac{136}{100} \times \left(\frac{100}{106}\right)^6$
 (c) $\frac{100}{136} \times \left(\frac{106}{100}\right)^6$
 (d) None of these
136. The difference between simple and compound interest for the fourth year is ₹ 7280 at 20% p.a. What is the principal sum?
 (a) 10000 (b) 50000
 (c) 1 lakh (d) 40000
137. The ratio of CI for 3 years and SI for 1 year for a fixed amount at a rate of $r\%$ is 3.64. What is the value of r ?
 (a) 10% (b) 15%
 (c) 20% (d) None of these
138. The compound interest on a certain sum for 2 years is ₹ 756 and SI (simple interest) is ₹ 720. If the same sum is invested such that the SI is ₹ 900 and the number of years is equal to the rate per cent per annum, find the new rate per cent :
 (a) 4
 (b) 5
 (c) 6
 (d) 1.0
139. Equal amount of ₹ 43892 is lent to two persons each for 3 years. One at 30% SI and second at 30% CI annually. By how much per cent the CI is greater than the simple interest received in this 3 years duration ?
 (a) 23% (b) 33%
 (c) 33.33% (d) None of these

ANSWER KEY

1. (c)	15. (a)	29. (b)	43. (b)	57. (a)	71. (d)	85. (a)	99. (a)	113. (d)	127. (c)
2. (c)	16. (c)	30. (d)	44. (a)	58. (a)	72. (d)	86. (c)	100. (b)	114. (c)	128. (c)
3. (d)	17. (c)	31. (b)	45. (d)	59. (b)	73. (b)	87. (d)	101. (a)	115. (b)	129. (d)
4. (d)	18. (b)	32. (b)	46. (c)	60. (c)	74. (c)	88. (a)	102. (a)	116. (c)	130. (a)
5. (c)	19. (c)	33. (c)	47. (a)	61. (a)	75. (a)	89. (c)	103. (a)	117. (b)	131. (b)
6. (b)	20. (a)	34. (b)	48. (c)	62. (b)	76. (a)	90. (b)	104. (a)	118. (a)	132. (c)
7. (c)	21. (c)	35. (c)	49. (c)	63. (d)	77. (a)	91. (a)	105. (a)	119. (b)	133. (b)
8. (b)	22. (c)	36. (c)	50. (b)	64. (a)	78. (a)	92. (a)	106. (a)	120. (b)	134. (d)
9. (b)	23. (c)	37. (b)	51. (c)	65. (b)	79. (d)	93. (a)	107. (a)	121. (b)	135. (b)
10. (d)	24. (d)	38. (c)	52. (b)	66. (a)	80. (b)	94. (a)	108. (a)	122. (b)	136. (b)
11. (d)	25. (c)	39. (d)	53. (b)	67. (b)	81. (a)	95. (c)	109. (a)	123. (c)	137. (b)
12. (b)	26. (c)	40. (c)	54. (a)	68. (c)	82. (a)	96. (d)	110. (a)	124. (d)	138. (b)
13. (c)	27. (b)	41. (d)	55. (b)	69. (c)	83. (a)	97. (d)	111. (a)	125. (c)	139. (b)
14. (c)	28. (b)	42. (d)	56. (d)	70. (b)	84. (c)	98. (c)	112. (d)	126. (d)	

Solution

1. (c) Principal = ₹ 2500,
Time = 2 years, Rate = 10%

Note : If the relation between principal, amount and compound interest is asked then follow the given below method.

$$\text{Rate} = 10\% = \frac{1 \rightarrow \text{Interest}}{10 \rightarrow \text{Principal}}$$

Principal	Amount
10	11
10	11
100	121
↓ ×25	↓ ×25
Principal 2500	Amount 3025

$$\therefore \text{Amount} = \text{₹ } 3025$$

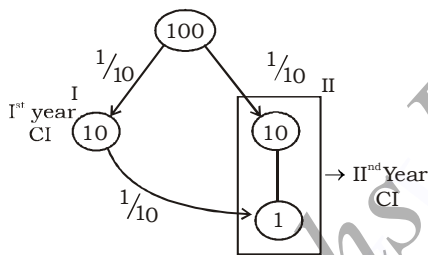
Alternate

$$\text{Rate} = 10\% = \frac{1}{10}$$

Let the principal

$$= (10)^2 = 100 \text{ Units}$$

↓
Principal



$$\begin{aligned} \text{Amount} &= \text{Principal} + \text{CI} \\ \text{Amount} &= 100 + 21 = 121 \text{ units} \\ \therefore 100 \text{ units} &= \text{₹ } 2500 \end{aligned}$$

$$1 \text{ unit} = \frac{2500}{100} = \text{₹ } 25$$

$$\therefore 121 \text{ units} = 25 \times 121 = \text{₹ } 3025 = \text{Amount}$$

2. (c) Principal = ₹ 4000, Time = 3 years

$$\text{Rate} = 5\% = \frac{1 \rightarrow \text{interest}}{20 \rightarrow \text{principal}}$$

Principal	Amount
20	21
20	21
20	21
(P) 8000	(A) 9261

According to the question,
8000 units = 4000

$$1 \text{ unit} = \frac{4000}{8000} = \frac{1}{2}$$

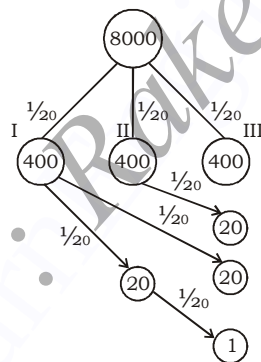
$$1261 \text{ units} = \frac{1261}{2}$$

$$= \text{₹ } 630.50$$

Alternate

Let the principal

$$\begin{aligned} \text{time} &= (20)^3 = 8000 \text{ Units} \\ &\downarrow \\ &\text{Principal} \end{aligned}$$



$$\begin{aligned} \text{Total CI} &= (400 + 400 + 400) + \\ &+ (20 + 20 + 20) + 1 \\ &= 1261 \text{ units} \end{aligned}$$

According to the question,
8000 units = ₹ 4000

$$1 \text{ unit} = \text{₹ } \frac{4000}{8000} = \frac{1}{2}$$

$$\begin{aligned} \therefore 1261 \text{ units} &= \frac{1261}{2} \\ &= \text{₹ } 630.50 \end{aligned}$$

3. (d) Interest is payable quarterly.

$$\therefore t = \frac{9}{12} \times 4 = 3 \text{ quarter years}$$

$$\text{Rate} = \frac{20}{4} = 5\%$$

$$= \frac{1 \rightarrow \text{interest}}{20 \rightarrow \text{principal}}$$

Principal	: Amount
I year 20	21
II year 20	21
III year 20	21
8000	9261

According to the question,

$$8000 \text{ units} = \text{₹ } 16000$$

$$1 \text{ unit} = \text{₹ } 2$$

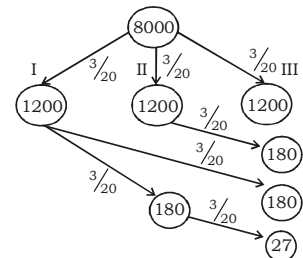
$$1261 \text{ units} = 1261 \times 2 = \text{₹ } 2522$$

4. (d) Principal = ₹ 9000, Rate = 15%

$$= \frac{3 \rightarrow \text{interest}}{20 \rightarrow \text{principal}}$$

$$\text{Time} = 2\frac{3}{5} \text{ years}$$

Let the principal = $(20)^3 = 8000 \text{ units}$



$$\begin{aligned} \text{3rd year CI} &= (1200 + (180 \times 2) \\ &+ 27) = 1587 \text{ units} \end{aligned}$$

$$\text{IIIrd year C.I.} = 1587 \text{ units}$$

$$\begin{aligned} \frac{3}{5} \text{ of IIIrd year C.I.} &= 1587 \times \frac{3}{5} \\ &= 952.2 \text{ units} \end{aligned}$$

$$\begin{aligned} \text{Total CI for } 2\frac{3}{5} \text{ years} &= (1200 + \\ &1200 + 180) + 952.2 \\ &= 3532.2 \text{ units} \end{aligned}$$

According to the question,

$$8000 \text{ units} = 9000$$

$$1 \text{ unit} = \frac{9000}{8000}$$

$$3532.2 \text{ units} = \frac{9000}{8000} \times 3532.2$$

$$= ₹ 3973.725$$

$$\text{Amount} = \text{Principal} + \text{CI}$$

$$\text{Amount} = 9000 + 3973.725$$

$$\text{Amount} = ₹ 12973.725$$

Note: We have total $\left(2\frac{3}{5}\right)$ years. we will calculate total CI of IIIrd year and then multiply $\frac{3}{5}$ in total CI of IIIrd year.

5. (c) Time = 2 years,
Let the principal = ₹ P

$$\therefore \text{Amount} = ₹ \frac{9}{4}P$$

We know,

$$\text{Amount} = \text{Principal} \left(1 + \frac{r}{100}\right)^t$$

Where, r = rate %, t = time in years

$$\frac{9}{4}P = P \left(1 + \frac{r}{100}\right)^2$$

$$\frac{3}{2} = 1 + \frac{r}{100} \Rightarrow \frac{r}{100} = \frac{1}{2}$$

$$\Rightarrow r = 50\%$$

Alternate:

(1) **Note :** To save more time we can use the option method.

$\therefore$ Amount is $\frac{9}{4}$ times of max. of Principal.

$$\left[\frac{9}{4}\right]5 \text{ means 5 more} = \frac{5}{4} \times 100$$

$$= 125\% \text{ (more)}$$

then take option = 50%

$$= x + x + \frac{x \times x}{100}$$

$$= 50 + 50 + \frac{50 \times 50}{100} = 125\%$$

So, 50% is the correct Ans.

(2) **Note:** To save your valuable time you can directly use the

below given formula.

$$\text{Rate}\% = \left[\left(\frac{\text{Amount}}{\text{Principal}} \right)^{1/t} - 1 \right] \times 100$$

$$\text{Rate}\% = \left[\left(\frac{9}{4} \right)^{1/2} - 1 \right] \times 100$$

$$\text{Rate}\% = \frac{1}{2} \times 100 = 50\%$$

Alternate $\rightarrow$ (2)

Let the principal = 4 units
 $\therefore$ Amount = 9 units

$$\begin{array}{ccc} \text{Principal} & : & \text{Amount} \\ \sqrt[2]{4} & : & \sqrt[2]{9} \\ 2 & : & 3 \end{array}$$

+1

Required Rate %

$$= \frac{\text{Interest}}{\text{Principal}} \times 100 = \frac{1}{2} \times 100 = 50\%$$

6. (b) Let the principal = ₹ P
According to the question,

$$\begin{array}{ccc} & 4 \text{ years} & 3 \text{ years} \\ P & \xrightarrow{\quad} 24000 & \xrightarrow{\quad} 27783 \end{array}$$

Case (I):

$$24000 = P \left(1 + \frac{r}{100}\right)^4 \dots\dots (i)$$

Case (II):

$$27783 = P \left(1 + \frac{r}{100}\right)^7 \dots\dots (ii)$$

On dividing equation (ii) by equation (i)

$$\left(1 + \frac{r}{100}\right)^3 = \frac{27783}{24000} = \frac{9261}{8000}$$

$$\left(1 + \frac{r}{100}\right) = \sqrt[3]{\frac{9261}{8000}}$$

$$1 + \frac{r}{100} = \frac{21}{20} \Rightarrow \frac{r}{100} = \frac{21}{20} - 1$$

$$\frac{r}{100} = \frac{1}{20} \Rightarrow r = 5\%$$

Alternate

$$\begin{array}{ccc} & 4 \text{ years} & 3 \text{ years} \\ P & \xrightarrow{\quad} 24000 & \xrightarrow{\quad} 27783 \end{array}$$

$$\begin{array}{ccc} \text{Principal} & : & \text{Amount} \\ 24000 & : & 27783 \\ \sqrt[3]{8000} & : & \sqrt[3]{9261} \\ 20 & : & 21 \end{array}$$

+1

$$\text{Rate of interest} = \frac{\text{Interest}}{\text{Principal}}$$

$$= \frac{1}{20} \times 100 = 5\%$$

Note

$\therefore$ Total CI of 4 years = 24000,
and Total CI of 7 years = 27783
So, Difference (7 CI - 4 CI) = 3
CI = 3783

Then we use 24000 as principal amount

7. (c) Principal = ₹ 1512,
Amount = ₹ 2401

By using formula,

$$2401 = 1512 \left(1 + \frac{1}{6}\right)^t$$

$$\left[\therefore 16\frac{2}{3}\% = \frac{1}{6}\right]$$

$$\frac{2401}{1512} = \left(\frac{7}{6}\right)^t$$

$$\frac{343}{216} = \left(\frac{7}{6}\right)^t$$

$$\left(\frac{7}{6}\right)^3 = \left(\frac{7}{6}\right)^t$$

Comparing both sides,
 $t = 3 \text{ years}$

Alternate

Note: (1) In such type of questions to save your valuable time try to follow the given below method.

$$\begin{array}{ccc} \text{Principal} & : & \text{Amount} \\ 1512 & : & 2401 \\ 216 & : & 343 \end{array}$$

$$\text{Rate}\% = 16\frac{2}{3}\% = \frac{1}{6}$$

Now,

Principal : Amount

$$\text{I}^{\text{st}} \text{ year} \rightarrow 6 : 7$$

$$\text{II}^{\text{nd}} \text{ year} \rightarrow 6 : 7$$

$$\text{III}^{\text{rd}} \text{ year} \rightarrow 6 : 7$$

$$\frac{216}{343}$$

Required time = 3 years.

Note: (2) Also take an idea from options to answer it quickly.

8. (b) Rate = $6\% = \frac{6}{100} = \frac{3}{50}$

Principal	Amount
I year 50	53
II year 50	53
2500	2809
$\downarrow \times 2$	$\downarrow \times 2$
5000	5618

$\therefore$ Required sum = ₹ 5000

9. (b) Rate % = $4\% = \frac{4}{100} = \frac{1}{25}$

Initial	Final
I year 25	24
II year 25	24
III year 25	24

15625 13824
According to the question,
13824 units = ₹ 70778.88

1 unit = ₹ $\frac{70778.88}{13824}$

$\therefore$ 15625 units = ₹ $\frac{70778.88}{13824} \times 15625$
= ₹ 80000

10. (d) Let principal = ₹ P

$\therefore$ Amount = ₹ 3P

According to the question,

Case (I): $3P = P \left(1 + \frac{r}{100}\right)^6$

$3 = \left(1 + \frac{r}{100}\right)^6 \dots\dots (i)$

Case (II): $81P = P \left(1 + \frac{r}{100}\right)^t$

$(3)^4 = \left(1 + \frac{r}{100}\right)^t \dots\dots (ii)$

from equation (i) & (ii)

$\left(1 + \frac{r}{100}\right)^{24} = \left(1 + \frac{r}{100}\right)^t$

Comparing both sides,

t = 24 years

Alternate:

Let the principal = 1 unit

$\therefore$ Amount = 3 units

Principal	Amount	Time
1	3	6
	$\downarrow$	$\downarrow \times 4$
	$3^4 = 81$	24 years

$\therefore$ Required time = 24 years

11. (d) Principal, P = ₹ 12000

$t_1 = 1$ year, $t_2 = 2$ years,

$t_3 = 3$ years

$r_1 = 5\%$, $r_2 = 6\%$, $r_3 = 10\%$

By using formula,

$A = 12000 \left(1 + \frac{5}{100}\right)$

$\left(1 + \frac{6}{100}\right)^2 \left(1 + \frac{10}{100}\right)^3$

$A = 12000 \times \frac{21}{20} \times \left(\frac{53}{50}\right)^2 \times \left(\frac{11}{10}\right)^3$

$A = 12000 \times \frac{21}{20} \times \frac{2809}{2500} \times \frac{1331}{1000}$

$A = 18843.446$

Compound interest
= 18843.446 – 12000
= ₹ 6843.45

Alternate

$5\% = \frac{1}{20}$, $6\% = \frac{3}{50}$, $10\% = \frac{1}{10}$

Principal	Amount
I year 20	21
II year 50	53
III year 50	53
IV year 10	11
V year 10	11
VI year 10	11

50,000,000 78514359
 $\swarrow$ Diff. $\searrow$
+28514359

50,000,000 units = ₹ 12000
28514359 units

$= \frac{12000}{50,000,000} \times 28514359$

= ₹ 6843.45

Required compound interest = ₹ 6843.45

12. (b) $r = 10\%$, $t = 2$ years,

SI = ₹ 400

SI for 1 year = $\frac{400}{2} = ₹ 200$

Compound interest

= $200 + \left[200 + \frac{200 \times 10}{100}\right]$

= ₹ 420

Alternate:

Note : If we want to calculate the compound interest for 2 years then follow the given below formula.

$CI = r + r + \frac{r \times r}{100}$

$\therefore CI = 10 + 10 + \frac{10 \times 10}{100} = 21\%$

According to the question,

Compound interest

= $\frac{400}{20} \times 21 = ₹ 420$

13. (c) **Note:** In such type of questions to save your valuable time try to follow the method given below.

2 years SI = ₹ 600

1 year SI = ₹ 300

Difference (CI – SI) = (900 – 600) = ₹ 300

Rate % = $\frac{300}{300} \times 100 = 100\%$

for 2 years SI = 200%

According to the question,

200% of sum = ₹ 600

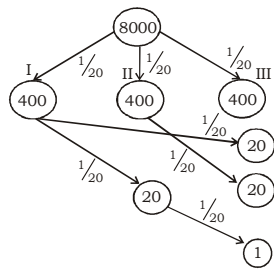
1% of sum = $\frac{600}{200} = ₹ 3$

100% of sum = $3 \times 100 = ₹ 300$

14. (c) $5\% = \frac{1}{20}$

Let the principal = $(20)^3$

= 8000 units



Difference in (CI - SI) for 3 years = $(20 \times 3 + 1)$

$$= 61 \text{ units}$$

$$61 \text{ units} = 91.50$$

$$1 \text{ unit} = \frac{91.50}{61}$$

$$8000 \text{ units} = \frac{91.50}{61} \times 8000$$

$$= ₹ 12000$$

Alternate

$$3 \text{ years SI} = 3 \times 5\% = 15\%$$

$$2 \text{ years CI} = 5 + 5 + \frac{5 \times 5}{100}$$

$$= 10.25\%$$

$$3 \text{ years CI} = 10.25 + 5 + \frac{10.25 \times 5}{100} = 15.7625\%$$

Difference in (CI - SI) =

$$(15.7625 - 15)\% = 0.7625\%$$

According to the question,

$$0.7625\% \text{ of sum} = 91.50$$

$$1\% \text{ of sum} = \frac{91.50}{0.7625}$$

$$100\% \text{ of sum} = \frac{91.50}{0.7625} \times 100$$

$$= ₹ 12000$$

15. (a) $t = 3 \text{ years}$, rate % = 10% =

1 → CI
10 → Principal

Principal	Amount
10	11
10	11
10	11
1000	1331
+331	
331 units	= ₹ 993

$$1 \text{ unit} = ₹ 3$$

$$1000 \text{ units} = ₹ 3 \times 1000 = ₹ 3000$$

Alternate

CI for 2 years

$$= 10 + 10 + \frac{10 \times 10}{100} = 21\%$$

CI for 3 years

$$= 10 + 21 + \frac{10 \times 21}{100} = 33.1\%$$

According to the question,

$$33.1\% \text{ of sum} = 993$$

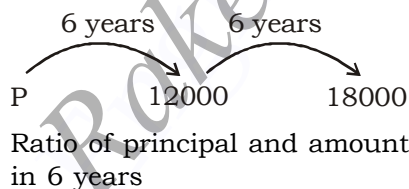
$$1\% \text{ of sum} = \frac{993}{33.1}$$

$$100\% \text{ of sum} = \frac{993}{33.1} \times 100$$

$$\text{sum} = ₹ 3000$$

16. (c) Note: To save your valuable time follow the below given method,

Let the principal = ₹ P



$$\text{Ratio of principal and amount in 6 years}$$

$$= \frac{18000}{12000} = \frac{3}{2}$$

$$\text{Now we can say, } P \times \frac{3}{2}$$

$$= 12000$$

$$P = ₹ 8000$$

17. (c) Rate of interest (R_1) = 3%

According to the question,

Rate (R_2) = 5% for C I

New rate (R_2) = 2.5%, time (t) = 2 half years

$$\text{CI for 2 years} = 2.5 + 2.5 + \frac{2.5 \times 2.5}{100} = 5.0625\%$$

$$\text{Difference} = (5.0625 - 3)\%$$

$$= 2.0625\%$$

$$2.0625\% \text{ of the sum} = ₹ 1320$$

$$1\% \text{ of the sum} = \frac{1320}{2.0625}$$

100% of the sum

$$= \frac{1320}{2.0625} \times 100$$

$$\text{sum} = ₹ 64000$$

Alternate

Case (i): $3\% = \frac{3}{100}$

Principal : Amount
100 : 103

Case (ii): $t = 1 \times 2 = 2 \text{ half years}$,

$$\text{Rate} = 2.5\% = \frac{1}{40}$$

Principal	Amount
40	41
40	41
1600	1681

Note: Principal would be same in both cases.

Principal:Amount	Principal:Amount
$100_{\times 16} : 103_{\times 16}$	$1600 : 1681$
$1600 : 1648$	

According to the question,

$$(1681 - 1648) \text{ units} = ₹ 1320$$

$$33 \text{ units} = ₹ 1320$$

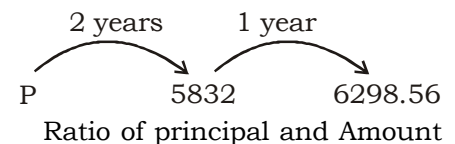
$$1 \text{ unit} = \frac{1320}{33}$$

$$1600 \text{ units} = \frac{1320}{33} \times 1600$$

$$= ₹ 64000$$

18. (b) Note: To save your valuable time try to follow the given below method.

Let the principal = ₹ P



Ratio of principal and Amount

$$= \frac{6298.56}{5832} = \frac{27}{25}$$

Principal : Amount = 27 : 25

Now according to the question,

$$P \times \frac{27}{25} \times \frac{27}{25} = 5832$$

$$P = \frac{5832 \times 25 \times 25}{27 \times 27} \Rightarrow ₹ 5000$$

$$\begin{array}{ccc} \text{Principal} & : & \text{Amount} \\ 25 & : & 27 \\ & \xrightarrow{+2} & \end{array}$$

$$\text{Rate \%} = \frac{2}{25} \times 100 = 8\%$$

19. (c) Rate % = $12\frac{1}{2}\%$

$$= \frac{1 \rightarrow \text{Interest}}{8 \rightarrow \text{Principal}}$$

According to the question,

Case (I): For one year

$$\begin{array}{ccc} \text{Principal} & : & \text{Amount} \\ (P_1) & : & (A_1) \\ 8 & : & 9 \\ \downarrow \times 1450 & & \downarrow \times 1450 \\ \boxed{11600} & & 13050 \end{array}$$

Case (II): For two years

$$\begin{array}{ccc} \text{Principal} & : & \text{Amount} \\ (P_2) & : & (A_2) \\ 8 & : & 9 \\ 8 & : & 9 \\ \hline 64 & : & 81 \\ \downarrow \times 280 & & \downarrow \times 280 \\ \boxed{17920} & & 22680 \end{array}$$

Total price of the car = $12000 + 11600 + 17920 = ₹ 41520$

20. (a) **Note:** In such type of questions follow the below given method to save your valuable time.

$$\text{Rate} = 4\% = \frac{1}{25}$$

Now take difference of time
= $(9 - 7) = 2$ years

$$\frac{\text{A's share}}{\text{B's share}} = \left(\frac{26}{25}\right)^2$$

A's share
B's share after two years

$$= \left(\frac{26}{25}\right)^2 = \frac{676}{625}$$

A's share : B's share = $676 : 625$

According to the question,

$$(676 + 625) \text{ units} = 19515$$

$$1301 \text{ units} = 19515$$

$$1 \text{ unit} = \frac{19515}{1301} = 15$$

$$\text{Share of A} = 676 \times 15 = ₹ 10140$$

$$\text{Share of B} = 625 \times 15 = ₹ 9375$$

21. (c) Let the amount of B = ₹ 400

∴ Amount of A

$$= 400 \times \frac{441}{400} = ₹ 441$$

Let A spends at the rate of $r\%$

According to the question,

$$400 \times \left(1 - \frac{9}{100}\right)^2 = 441 \times \left(\frac{100 - r}{100}\right)^2$$

$$\frac{400}{441} = \frac{(100 - r)^2}{(91)^2}$$

Square root of both sides

$$\frac{20}{21} = \frac{(100 - r)}{91}$$

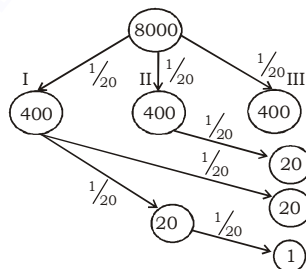
$$100 - r = \frac{20 \times 91}{21} = \frac{260}{3}$$

$$r = 100 - \frac{260}{3} = \frac{40}{3}$$

$$r = 13\frac{1}{3}\%$$

22. (c) Rate % = $5\% = \frac{1}{20}$

Let the principal = $(20)^3 = 8000$ units



$$\text{CI for 3rd year} = (400 + 20 + 20 + 1) = 441 \text{ units}$$

$$\text{CI for IInd year} = (400 + 20) = 420 \text{ units}$$

$$\text{Difference} = (441 - 420) = 21 \text{ units}$$

Total CI for 3 year

$$= (400 \times 3 + 20 \times 3 + 1)$$

$$= 1261 \text{ units}$$

According to the question,

$$21 \text{ units} = 26.25$$

$$1 \text{ unit} = \frac{26.25}{21}$$

$$1261 \text{ units} = \frac{26.25}{21} \times 1261 = ₹ 1576.25$$

$$\text{Similarly, } 1 \text{ unit} = \frac{26.25}{21}$$

$$8000 \text{ units} = \frac{26.25}{21} \times 8000 = ₹ 10,000$$

23. (c) $R_1 = 3\% = \frac{3}{100}$,

$$R_2 = 4\% = \frac{1}{25}$$

$$R_3 = 5\% = \frac{1}{20}$$

According to the question,

	Principal	Amount
Ist year	100	103
IIst year	25	26
IIIst year	20	21
	50000	56238
	$\downarrow \times \frac{1}{2}$	$\downarrow \times \frac{1}{2}$
	25000	28119
∴	Required principal = ₹ 25000	

24. (d) Rate % = 5%

$$\text{SI for 3 years} = 5 \times 3 = 15\%$$

$$\text{CI for 3 years} = 15.7625\%$$

According to the question,

$$(15.7625 - 15)\% \text{ of the sum} = 152.50$$

$$0.7625\% \text{ of the sum} = 152.50$$

$$1\% \text{ of the sum} = \frac{152.50}{0.7625}$$

$$\text{Sum} = 100\% = \frac{152.50}{0.7625} \times 100$$

$$\text{Sum} = ₹ 20,000$$

Interest paid by A

$$= \frac{20,000 \times 15}{100} = ₹ 3000$$

Interest paid by B

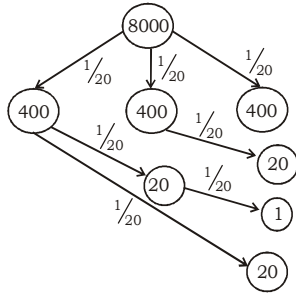
$$= \frac{20,000 \times 15.7625}{100}$$

$$= ₹ 3152.50$$

Alternate:

$$\text{Rate} = 5\% = \frac{1}{20}$$

Let the principal = $(20)^3$
= 8000 units



According to the question,

$$(CI - SI) = (1261 - 1200) \text{ units} = 152.50$$

$$1 \text{ units} = \frac{152.50}{61}$$

$$8000 \text{ units} = \frac{152.50}{61} \times 8000$$

$$\text{Required sum} = ₹ 20,000$$

Interest paid by A

$$= \frac{152.50}{61} \times 1200 = ₹ 3000$$

Interest paid by B

$$= \frac{152.50}{61} \times 1261 = ₹ 3152.50$$

25. (c) Let the sum deposited in the bank = ₹ P

$$R_1 = 8\%$$

$$R_2 = \frac{10}{2} = 5\%, \text{ time} = 1 \times 2 \\ = 2 \text{ half years}$$

$$\text{Total CI for two years} = 5 + 5 + \frac{5 \times 5}{100} \\ = 10.25\%$$

According to the question,

$$(10.25 - 8)\% \text{ of sum} = 675$$

$$2.25\% \text{ of sum} = ₹ 675$$

$$1\% \text{ of sum} = \frac{675}{2.25}$$

$$\text{Required sum} = 100\%$$

$$= \frac{675}{2.25} \times 100$$

$$\text{Required sum} = ₹ 30,000$$

26. (c) Year 1973 Year 1982 Year 1991

$$\text{sum} \rightarrow x \xrightarrow{9 \text{ years}} y \xrightarrow{9 \text{ years}} z$$

Note : In this question the rate of interest is same. So we can say that ratio would be same.

$$\frac{y}{x} = \frac{z}{y}$$

$$y^2 = zx$$

$$27. (b) \text{ Total price} = (125000 + 180,000) = ₹ 305000$$

$$20\% = \frac{1}{5}, 10\% = \frac{1}{10}$$

House		Car	
Initial	Final	Initial	Final
Ist year 5	6	Ist year 10	9
IIInd year 5	6	IIInd year 10	9
25	36	100	81
↓ × 5000	↓ × 5000	↓ × 1800	↓ × 1800
125000	180,000	180,000	145800

$$\text{New total price} = (180000 + 145800) \\ = ₹ 325800$$

$$\text{Profit} = (325800 - 305000) \\ = ₹ 20800$$

$$28. (b) \text{ Rate} = 10\% = \frac{1}{10}$$

Amount	Installment
I st year → 10 _{×121}	11 _{×121}
II nd year → 100 _{×11}	121 _{×11}
III rd year → 1000	1331

Note : But installment is same for all years.

$$\therefore \text{Total Amount} = (1210 + 1100 + 1000) \\ = ₹ 3310$$

According to the question,

$$3310 \text{ units} = ₹ 6300$$

$$1331 \text{ units} = \frac{6300}{3310} \times 1331 \\ = ₹ 2533.32$$

$$29. (b) \text{ Rate} = 5\% = \frac{1}{20}$$

Amount	Installment
20 _{×441}	21 _{×441}
400 _{×21}	441 _{×21}
8000	9261

Note → Installment is same for all the years.

$$\therefore \text{Total Amount} = 8820 + 8400 + 8000 = 25220$$

$$\text{According to the question,} \\ 25220 \text{ units} = ₹ 8000$$

$$1 \text{ units} = \frac{8000}{25220}$$

$$9261 \text{ units} = \frac{8000}{25220} \times 9261$$

$$\text{Value of each installment} \\ = ₹ 2937.66$$

$$30. (d) \text{ Rate \%} = 10\% = \frac{1}{10}$$

Amount	Installment
10 _{×121}	11 _{×121}
100 _{×11}	121 _{×11}
1000	1331

Note: Installment is same for all the years.

$$\therefore \text{Total amount} = 1210 + 1100 + 1000 = 3310$$

According to the question,

$$1331 \text{ units} = ₹ 2662$$

$$1 \text{ unit} = \frac{2662}{1331}$$

$$3310 \text{ units} = \frac{2662}{1331} \times 3310 \\ = ₹ 6620$$

$$31. (b) \text{ Rate \%} = 6\frac{1}{4}\% = \frac{25}{4 \times 100} = \frac{1}{16}$$

Principal	Amount
Ist year 16	17
IIInd year 16	17
256	289
+33	

According to the question,

$$256 \text{ units} = ₹ 1280$$

$$1 \text{ unit} = \frac{1280}{256}$$

$$33 \text{ units} = \frac{1280}{256} \times 33 \\ = ₹ 165$$

32. (b) Rate % = 10% = $\frac{1}{10}$

Principal	Amount
Ist year 10	11
IInd year 10	11
IIIRD year 10	11
1000	1331
$\xrightarrow{+331}$	

According to the question,
1000 units = 7500

$$1 \text{ unit} = \frac{7500}{1000}$$

$$331 \text{ units} = \frac{7500}{1000} \times 331 = ₹ 2482.50$$

$$1331 \text{ units} = \frac{7500}{1000} \times 1331 = ₹ 9982.50$$

compound interest
= ₹ 2482.50
Amount = ₹ 9982.50

33. (c) Time (t) = $1\frac{1}{2}$ years ;

$$\text{Rate\%} = 10\%$$

If the interest is payable half yearly

$$\text{New rate} = 5\%, t = \frac{3}{2} \times 2 = 3 \text{ half years}$$

3 years CI = 15.7625% of the sum

$$3 \text{ years CI} = \frac{6000 \times 15.7625}{100} = ₹ 945.75$$

Alternate: Rate % = 5% = $\frac{1}{20}$

According to the question,
(20)³ = 8000 units = 6000

Principal	Amount
Ist year 20	21
IInd year 20	21
IIIRD year 20	21
8000	9261
$\xrightarrow{+1261}$	

According to the question
8000 units = 6000

$$1 \text{ unit} = \frac{6000}{8000}$$

$$1261 \text{ units} = \frac{6000}{8000} \times 1261 = ₹ 945.75$$

34. (b) According to the question,
Interest is payable at every 5 months

$$\text{New rate} = 24 \times \frac{5}{12} = 10\% = \frac{1}{10}$$

New time = 15 months = 3, five months

Principal	Amount
Ist year 10	11
IInd year 10	11
IIIRD year 10	11
1000	1331
$\downarrow \times \frac{5}{2}$	$\downarrow \times \frac{5}{2}$
2500	3327.50

Required amount = ₹ 3327.50

35. (c) Rate = $12\frac{1}{2}\% = \frac{1}{8}$,
t = 3 years

Principal	Amount
Ist year 8	9
IInd year 8	9
IIIRD year 8	9
512	729
$\xrightarrow{+217}$	

According to the question
217 units = ₹ 4340

$$1 \text{ unit} = \frac{4340}{217}$$

$$512 \text{ units} = \frac{4340}{217} \times 512 = ₹ 10240$$

The amount invested by him in trade initially = ₹ 10240

36. (c) Rate = 5% = $\frac{1}{20}$,
time = 3 years

Principal	Amount
Ist year 20	21
IInd year 20	21
IIIRD year 20	21
8000	9261
$\downarrow \times \frac{1}{2}$	$\downarrow \times \frac{1}{2}$
4000	4630.50

∴ Required sum = ₹ 4000

37. (b) CI = ₹ 4085,
Rate % = 6.25%, t = 3 years

$$\text{Rate} = 6.25\% = \frac{1}{16}$$

Principal	Amount
Ist year 16	17
IInd year 16	17
IIIRD year 16	17
4096	4913
$\xrightarrow{+817}$	

According to the question,
817 units = ₹ 4085

$$1 \text{ units} = \frac{4085}{817}$$

$$4096 \text{ units} =$$

$$\frac{4085}{817} \times 4096 = ₹ 20480$$

38. (c) Rate % = 12.5% = $\frac{1}{8}$

time = 2 years

Initial	Final
Ist year 8	7
IInd year 8	7
64	49
$\downarrow \times 3000$	$\downarrow \times 3000$
192000	147000

Required price of car
= ₹ 1,92,000

39. (d) According to the question,
case (i) Principal = P
Amount = 2P
Let rate = r%

$$2P = P \left(1 + \frac{r}{100} \right)^5 \dots\dots\dots(i)$$

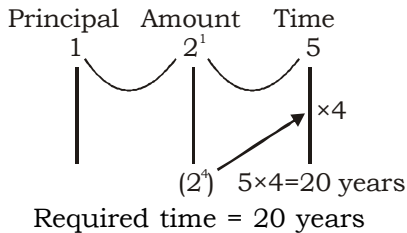
Case (ii) 16P

$$= P \left(1 + \frac{r}{100} \right)^t \dots\dots(ii)$$

From equation (i) and (ii)

$$\left(1 + \frac{r}{100} \right)^{20} = \left(1 + \frac{r}{100} \right)^t$$

t = 20 years

Alternate

40. (c) Rate = $4\% = \frac{1}{25}$, time = 3 years

Principal	:	Amount
Ist year 25		26
IInd year 25		26
IIIrd year 25		26
15625		17576
↓ × 1		↓ × 1
15625		17576

Required sum = (17576 - 550)
= ₹ 17026

41. (d) $R_1 = 10\% = \frac{1}{10}$,

$R_2 = 5\% = \frac{1}{20}$,

= ₹ 6.25% = $\frac{1}{16}$

Principal	Amount
Ist year 10	11
IInd year 10	11
IIIrd year 20	21
IVth year 20	21
Vth year 20	21
VIth year 16	17

12800000 19049877

According to the question,

12800000 units = ₹ 6400

1 units = $\frac{6400}{12800000}$

19049877 units = $\frac{6400}{12800000}$

× 19049877

= 9524.94 ≈ ₹ 9525

Required amount = ₹ 9525

42. (d) Rate % = $2\frac{1}{2}\% = \frac{5}{2}\%$

= $\frac{5}{200} = \frac{1}{40}$

t = 3 years

Principal	Amount
Ist year 40	39
IInd year 40	39
IIIrd year 40	39
64000	59319

According to the question,

64000 units = 120,000

1 units = $\frac{120,000}{64000}$

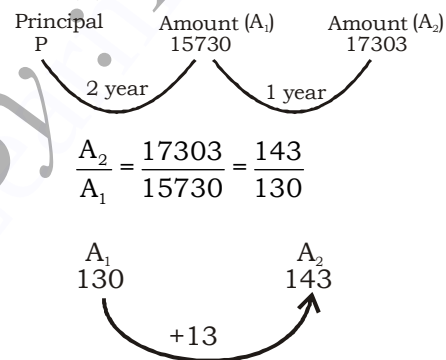
∴ 59319 units

= $\frac{120,000}{64000} \times 59319$

= ₹ 111223

Required salary of the officer =
₹ 1,11,223

43. (b) Let the principal = ₹ P



$\frac{A_2}{A_1} = \frac{17303}{15730} = \frac{143}{130}$

$\frac{A_2}{A_1} = \frac{143}{130}$

Rate % = $\frac{13}{130} \times 100 = 10\%$

Note: We can use amount (130) as a principal amount for next year

Required rate% = 10%

$P \times \frac{143}{130} \times \frac{143}{130} = 15730$

P = 13000

Required principal = ₹ 13000

44. (a) **Note:** In such case of half year, rate becomes half and time becomes twice

Rate (R_1) = 20%, time (t_1) = 1 years

Rate (R_2) = $\frac{20}{2} = 10\%$,

time (t_2) = $1 \times 2 = 2$ half years

Effective rate (r_2) for 2 years

= $10 + 10 + \frac{10 \times 10}{100} = 21\%$

According to the question,

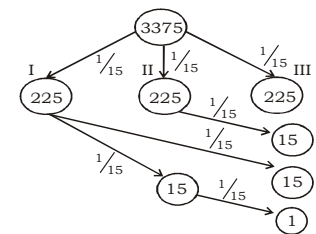
1% of the sum = 1240.50

100% of sum = 1240.50 × 100

Required sum = 124050

45. (d) Rate = $\frac{20}{3}\% = \frac{1}{15}$

Let the principal = $(15)^3 = 3375$ units



Difference in (CI - SI) for 3 years

= $(15 \times 3 + 1) = 46$ units

According to the question,

46 units = ₹ 460

1 unit = $\frac{460}{46} = ₹ 10$

3375 units = $10 \times 3375 = ₹ 33750$

∴ Required sum = ₹ 33750

46. (c) $10\% = \frac{1}{10}$, $5\% = \frac{1}{20}$,

$12\% = \frac{3}{25}$

	Initial	Final
Ist year	10	11
IInd year	20	19
IIIrd year	25	28
5000		5852
↓ × 8		↓ × 8
40,000		46,816

Initial population of the city

= 40,000

AlternateLet $(P) = x$

$$x \times \frac{110}{100} \times \frac{95}{100} \times \frac{112}{100} = 46816$$

$$x = 40,000$$

47. (a) According to the question,

Case (I): 10% of sum (S_1) = ₹ 820

$$\text{Sum } (S_1) = ₹ 8200$$

Case (II): 10.25% of sum (S_2) = ₹ 820

$$\text{Sum } (S_2) = ₹ 8000$$

$$\begin{aligned} \text{Required difference} &= (S_1 - S_2) \\ &= 8200 - 8000 = ₹ 200 \end{aligned}$$

$$48. (c) \quad 20\% = \frac{1}{5}, \quad 25\% = \frac{1}{4}$$

	Initial	Final
Ist year	5	6
IInd year	5	6
IIIrd year	4	3
	100	108
	↓ × 1000	↓ × 1000
	1000,00	1080,00

$$\text{Initial price} = ₹ 1,00,000$$

$$49. (c) \quad \text{Rate} = 16\frac{2}{3}\% = \frac{1}{6}$$

Difference in ages of sons

$$= (17 - 14) = 3 \text{ years}$$

Ratio of shares of Rakesh Yadav and Bhuvnesh

$$= (6)^3 : (7)^3$$

$$= 216 : 343$$

Now according to the question,

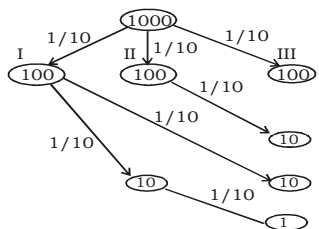
$$(216 + 343) \text{ units} = ₹ 22360$$

$$1 \text{ unit} = \frac{22360}{559} = ₹ 40$$

$$\text{Share of Rakesh yadav} = 40 \times 216 = ₹ 8640$$

$$\text{Share of Bhuvnesh} = 40 \times 343 = ₹ 13720$$

$$50. (b) \quad \text{Rate} = 10\% = \frac{1}{10}$$

Let principal = $(10)^3 = 1000$ units

$$\text{CI for 3rd year} = (100 + 10 + 10 + 1) = 121 \text{ units}$$

$$\text{SI for 3rd year} = 100 \text{ units}$$

According to the question,

$$(121 + 100) \text{ units} = ₹ 4420$$

$$221 \text{ units} = 4420$$

$$1 \text{ unit} = \frac{4420}{221}$$

$$\begin{aligned} 1000 \text{ units} &= \frac{4420}{221} \times 1000 \\ &= ₹ 20,000 \end{aligned}$$

51. (c) Let the principal $P_1 = 400$, and $P_2 = 500$ let the rate of interest = $r\%$

According to the question,

$$400 \left(1 + \frac{r}{100}\right)^2 = 500 \left(1 + \frac{r}{100}\right)$$

$$\left(1 + \frac{r}{100}\right) = \frac{5}{4}$$

$$\frac{r}{100} = \frac{1}{4} \Rightarrow \boxed{r = 25\%}$$

Alternate

Note; We can also solve this question from options.

$$\text{option (c); Rate} = 25\% = \frac{1}{4}$$

According to the question,

$$\text{L.H.S} = \text{R.H.S}$$

$$400 \times \left(\frac{5}{4}\right)^2 = \left(500 \times \frac{5}{4}\right)$$

$$625 = 625$$

Since, both sides are equal hence option (c) is correct.

$$52. (b) \quad 12\% = \frac{3}{25}, \quad 15\% = \frac{3}{20}$$

$$\text{Initial total cost} = 5,00,000 + 7,00,000$$

$$= 12,00,000$$

House

	Initial	Final
Ist year	25	28
IInd year	25	28
IIIrd year	25	28
	15625	21952
	↓ × 32	↓ × 32
	5,00,000	702464

Car

	Initial	Final
Ist year	20	17
IInd year	20	17
IIIrd year	20	17
	8000	4913
	↓ × 87.5	↓ × 87.5
	7,00,000	429887.5

$$\text{Final price} = 702464 + 429887.5 = 1132351.5$$

$$\text{Loss} = 1200000 - 1132351.5$$

$$\text{Loss} = ₹ 67648.5$$

$$53. (b) \quad \text{Rate} = 10\% = \frac{1}{10}$$

Amount to be paid after 1 year

$$= 9000 \times \frac{11}{10} = 9900$$

$$\text{Remaining amount} = (9900 - 3000) = ₹ 6900$$

Amount to be paid in second

$$\text{year} = 6900 \times \frac{11}{10} = ₹ 7590$$

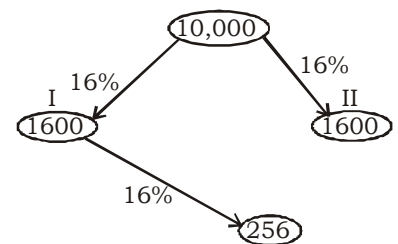
$$\text{Remaining amount} = (7590 - 3000) = ₹ 4590$$

Amount to be paid in IIIrd year

$$= 4590 \times \frac{11}{10} = ₹ 5049$$

54. (a) Principal = ₹ 10,000

Case (i)

Interest for $\frac{3}{2}$ years earned by Sita.

$$= 1600 + \frac{1856}{2} = 1600 + 928$$

$$= ₹ 2528$$

Case (ii) Rate for Harsha

$$= \frac{15}{2}\% = \frac{15}{2 \times 100} = \frac{3}{40}$$

$$\text{Time} = \frac{3}{2} \times 2 = 3 \text{ years}$$

Principal	Amount
40	43
40	43
40	43
64000	79507

Interest for Harsha = 15507 units
64000 units = 10000

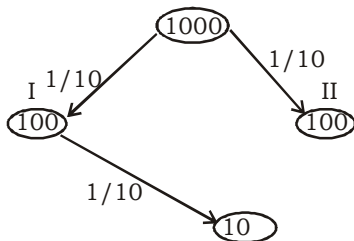
$$1 \text{ unit} = \frac{10000}{64000}$$

$$15507 \text{ units} = \frac{10000}{64000} \times 15507 = ₹ 2422.97$$

So we can say Sita will get more interest.

55. (b) Let the principal = $(10)^3$
= 1000 units

Case (i)



Interest rate for $1\frac{1}{2}$ years

$$= 100 + \frac{110}{2} = 155$$

Case(ii)

$$\text{Time} = \frac{3}{2} \times 2 = 3 \text{ half years}$$

$$\text{New rate} = \frac{10}{2} = 5\% = \frac{1}{20}$$

Principal : Amount

20	21
20	21
20	21
8000	9261

$$8000 \text{ units} = 1000$$

$$1 \text{ units} = \frac{1000}{8000} = \frac{1}{8}$$

$$1261 \text{ units} = \frac{1}{8} \times 1261 = 157.625 \text{ units}$$

$$\text{Difference} = 157.625 - 155 = 2.625 \text{ units}$$

According to the question,
2.625 units = 36.75

$$1 \text{ unit} = \frac{36.75}{2.625}$$

$$1000 \text{ units} = \frac{36.75}{2.625} \times 1000 = ₹ 14000$$

∴ Required sum = ₹ 14000

Alternate:-

To save your valuable time try to follow the given below method.

Effective rate % of CI for $1\frac{1}{2}$ year

$$= 10 + 5 + \frac{10 \times 5}{2} = 15.50\%$$

Effective rate % of CI for 3 half years = 15.7625%

According to the question,
(15.7625 - 15.50)% of the sum = ₹ 36.75

$$0.2625\% \text{ of the sum} = 36.75$$

$$\text{Required sum} = \frac{36.75}{0.2625} \times 100 = ₹ 14000$$

56. (d) Rate = $5\% = \frac{1}{20}$,

$$\text{Total amount} = 20 + 1 = 21$$

Principal	Amount
Ist year 20	21
IInd year 20	21
IIIrd year 20	21
8000	9261

According to the question,
1261 units = 2522

$$1 \text{ unit} = \frac{2522}{1261} = 2$$

$$8000 \text{ units} = 2 \times 8000 = ₹ 16000$$

Required sum = ₹ 16000

Alternate

Rate = 5%

$$5 + 5 + \frac{5 \times 5}{100} = 10.25\% \text{ (for two year)}$$

$$10.25 + 5 + \frac{10.25 \times 5}{100}$$

$$= 15.7625\% \text{ (for three year)}$$

Effective rate % for 3 years

$$= 15.7625\%$$

According to the question,
Required sum

$$= \frac{2522}{15.7625} \times 100 = ₹ 16000$$

57. (a) Rate = 6%

$$= \frac{3}{50} \rightarrow \text{Interest}$$

Principal	Amount
50	53
50	53

2500	2809
↓ × 1	↓ × 1
2500	2809

Required principal = ₹ 2500

58. (a) Rate % = 5%

$$= \frac{1}{20} = \frac{19}{20} \rightarrow \text{A's share}$$

$$= \frac{1}{20} = \frac{19}{20} \rightarrow \text{B's share}$$

Note : They are spending the money

Difference in years = (11 - 9) = 2 years

$$\text{A's share : B's share} = (19)^2 : (20)^2$$

Ratio of A's and B's amount
= 361 : 400

According to the question ,
(361 + 400) units = ₹ 22830

$$1 \text{ unit} = \frac{22830}{761} = ₹ 30$$

$$361 \text{ units} = 30 \times 361 = ₹ 10830$$

$$400 \text{ units} = 30 \times 400 = ₹ 12000$$

Initially amount given to A

$$= ₹ 10830$$

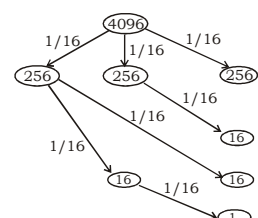
Initially amount given to B

$$= ₹ 12000$$

Note: Difference of year is put in the form of power.

59. (b) Let the principle = $(16)^3$
= 4096 units

$$\text{Rate} = 6\frac{1}{4}\% = \frac{1}{16}$$



Simple interest for 3 years

$$= 256 \times 3$$

$$= 768 \text{ units}$$

Compound interest for 3 years =

$$768 + 49 = 817 \text{ units}$$

According to the question

$$(817 - 768) \text{ units}$$

$$= ₹ 717.77343$$

$$49 \text{ units} = ₹ 717.77343$$

$$4096 \text{ units} = \frac{717.77343}{49} \times 4096$$

$$= ₹ 60000$$

$$\text{Required sum} = ₹ 60000$$

Interest received by Geeta

$$= \frac{717.77343}{49} \times 817$$

$$\approx ₹ 11967.77$$

60. (c) $R_1 = 10\%$, $t_1 = 1$ year

$$R_2 = \frac{12}{2} = 6\%, t_2 = 1 \times 2 = 2 \text{ half years}$$

Effective Rate(R_2) of interest

$$= 6 + 6 + \frac{6 \times 6}{100} = 12.36\%$$

According to the question,

$$(12.36 - 10)\% \text{ of sum}$$

$$= ₹ 1888$$

$$2.36\% \text{ of sum} = ₹ 1888$$

$$1\% \text{ of sum} = \frac{1888}{2.36}$$

$$100\% \text{ of sum} = \frac{1888}{2.36} \times 100$$

$$= ₹ 80,000$$

61. (a) Rate = $10\% = \frac{1}{10}$

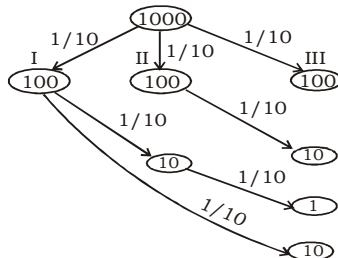
$$\therefore 10 + 10 + \frac{10 \times 10}{100} = 21 \text{ (for first two year)}$$

$$10 + 10 + \frac{10 \times 10}{100} = 21 \text{ (for last two year)}$$

 $\therefore$ For 4 years effective Rate % = 46.41%

$$\left[\therefore 21 + 21 + \frac{21 \times 21}{100} = 46.41\% \right]$$

$$\text{Let principal} = (10)^3 = 1000 \text{ units}$$



$$\text{CI for III}^{\text{rd}} \text{ year} = (100 + 21)$$

$$= 121 \text{ units}$$

$$\text{CI for II}^{\text{rd}} \text{ year} = (100 + 10)$$

$$= 110 \text{ units}$$

According to the question

$$(121 - 110) \text{ units} = ₹ 990$$

$$11 \text{ units} = ₹ 990$$

$$1 \text{ unit} = ₹ 90$$

$$1000 \text{ units} = ₹ 90 \times 1000$$

$$= ₹ 90,000$$

$$4 \text{ years CI} = 90,000 \times \frac{46.41}{100}$$

$$= ₹ 41769$$

$$\text{Required sum} = ₹ 90,000$$

$$\text{Required CI} = ₹ 41769$$

Alternate → Rate = 10%

$$\text{CI for 2nd year}$$

$$= 10 + \frac{10 \times 10}{100} = 11\%$$

$$\text{CI for 3rd year} = 10 + \frac{10 \times 10}{100}$$

$$+ \frac{10 \times 10}{100} + \frac{1 \times 10}{100} = 12.1\%$$

$$\text{Difference} = (12.1 - 11)\% = 1.1\%$$

According to the question,

$$1.1\% \text{ of sum} = 990$$

$$1\% \text{ of sum} = \frac{990}{1.1}$$

$$100\% \text{ of sum} = \frac{990 \times 100}{1.1}$$

$$= ₹ 9,0000$$

Similarly,

$$4 \text{ years CI} = 90,000 \times \frac{46.41}{100}$$

$$= ₹ 41769$$

$$62. (b) R_1 = 5\% = \frac{1}{20}, R_2$$

$$= 10\% = \frac{1}{10}$$

$$R_3 = 20\% = \frac{1}{5}$$

	Principal	Amount	
Ist year	20	21	5%
IInd year	10	11	10%
IIIrd year	10	11	10%
IVth year	5	6	20%
Vth year	5	6	20%

$$50,000$$

$$91476$$

$$\times 1.2$$

$$\times 1.2$$

$$60,000$$

$$109771.20$$

Required Principal

$$= ₹ 60000$$

63. (d) Let the income of B = 27

According to the question,

$$A : B$$

$$\sqrt[3]{64} : \sqrt[3]{27}$$

$$[\therefore A = 27 + 37]$$

$$\text{Ist year} \rightarrow 4 : 3$$

Let the rate of interest for A = $r\%$

According to the Questions,

$$4 \times \left(1 - \frac{r}{100}\right) = 3 \times \left(1 - \frac{1}{10}\right)$$

$$1 - \frac{r}{100} = \frac{27}{40}$$

$$\frac{r}{100} = \frac{13}{40} \Rightarrow r = \frac{65}{2} = 32\frac{1}{2}\%$$

64. (a) Let the principal = P

 $\therefore$ According to the question,

$$\text{Rate \%} = 10\%$$

$$= \frac{1 \rightarrow \text{CI}}{10 \rightarrow \text{Principal}} = \frac{11 \rightarrow \text{Amount}}{10 \rightarrow \text{Principal}}$$

$$P \times \left(\frac{11}{10}\right)^3 + P \times \left(\frac{11}{10}\right)^2 + P \times \left(\frac{11}{10}\right) =$$

$$7282$$

$$\frac{3641}{1000} P = 7282$$

$$P = ₹ 2000$$

Required principal (P) = ₹ 2000

65. (b) Let the initial principal

$$= 100 P$$

$$\therefore \text{Amount} = 100P \times \frac{11}{10} \times \frac{11}{10} = 121 P$$

Principal	:	Amount
100P		121P
$\begin{array}{c} \text{21P} \\ \downarrow \\ \text{CI} \end{array}$		

Remaining amount

$$= (121P - 2050)$$

According to the question,

$$(121P - 2050) \times \frac{1}{10} = 21P \times \frac{8}{21}$$

$$121P - 2050 = 80P$$

$$41P = 2050$$

$$P = 50$$

$$\text{Principal} = 50 \times 100$$

$$= ₹ 5000$$

$$66. (a) \text{ Rate } \% = 5\% = \frac{1}{20}$$

$$= \frac{21 \rightarrow \text{Amount}}{20 \rightarrow \text{Principal}}$$

According to the question

Case (i): Bhuvnesh pays after 1 year
₹ 1680

Principal	:	Installment
20	:	21
$\downarrow \times 80$		$\downarrow \times 80$
1600		1680

Case (ii): After two years Bhuvnesh pays ₹ 5292

Principal	:	Installment
400	:	441
$\downarrow \times 12$		$\downarrow \times 12$
4800		5292

Total cost of scooter

$$= 12000 + 1600 + 4800$$

$$= ₹ 18400$$

$$67. (b) \text{ Rate } \% = 20\%$$

$$= \frac{1 \rightarrow \text{CI}}{5 \rightarrow \text{Principal}}$$

$$= \frac{6 \rightarrow \text{Amount}}{5 \rightarrow \text{Principal}}$$

Let the two parts of the sum is P_1 and P_2 respectively.

$$\begin{aligned} & \text{Difference in time} \\ & = (5 - 3) = 2 \text{ years} \\ & \text{Ratio of } P_1 \text{ and } P_2 = (6)^2 : (5)^2 \\ & = 36 : 25 \end{aligned}$$

According to the question,

$$(36 + 25) \text{ units} = ₹ 30500$$

$$61 \text{ units} = ₹ 30500$$

$$1 \text{ unit} = \frac{30500}{61} = ₹ 500$$

$$\therefore \text{Part } (P_1) = 500 \times 36 = ₹ 180,00$$

$$\text{Part } (P_2) = 500 \times 25 = ₹ 125,00$$

68. (c) Let the three parts P_1 , P_2 , and P_3 .

According to the question,

$$5\% = \frac{1 \rightarrow \text{CI}}{20 \rightarrow \text{Principal}}$$

$$= \frac{21 \rightarrow \text{Amount}}{20 \rightarrow \text{Principal}}$$

According to the question,

$$P_1 \times \left(\frac{21}{20}\right)^2 = P_2 \times \left(\frac{21}{20}\right)^3 = P_3 \times \left(\frac{21}{20}\right)^4$$

$$P_1 = P_2 \times \frac{21}{20} = P_3 \times \frac{441}{400}$$

$$400P_1 = 420P_2 = 441P_3$$

$$P_1 : P_2 = 21 : 20$$

$$P_2 : P_3 = 21 : 20$$

$$P_1 : P_2 : P_3 = 441 : 420 : 400$$

$$(441 + 420 + 400) \text{ units}$$

$$= ₹ 25220$$

$$1261 \text{ units} = ₹ 25220$$

$$1 \text{ unit} = \frac{25220}{1261} = ₹ 20$$

$$P_1 = 20 \times 441 = ₹ 8820$$

$$P_2 = 20 \times 420 = ₹ 8400$$

$$P_3 = 20 \times 400 = ₹ 8000$$

69. (c) Rate % = 5%

$$= \frac{1 \rightarrow \text{CI}}{20 \rightarrow \text{Principal}}$$

$$= \frac{21 \rightarrow \text{Amount}}{20 \rightarrow \text{Principal}}$$

Amount Installment

$$20_{\times 441} \quad 21_{\times 441}$$

$$400_{\times 21} \quad 441_{\times 21}$$

$$8000 \quad 9261$$

Note: Installment is same for all three years.

$$\begin{aligned} \therefore \text{Total amount} \\ & = (8820 + 8400 + 8000) \\ & = 25220 \text{ units} \end{aligned}$$

Installment = 9261 units

According to the question,

$$25220 \text{ units} = ₹ 2522$$

$$1 \text{ unit} = \frac{2522}{25220}$$

$$9261 \text{ units} = \frac{2522}{25220} \times 9261$$

$$= ₹ 926.10$$

Required value of installment

$$= ₹ 926.10$$

$$70. (b) \text{ Rate} = 10\% = \frac{1}{10}$$

Amount Installment

$$10_{\times 121} \quad 11_{\times 121}$$

$$100_{\times 11} \quad 121_{\times 11}$$

$$1000 \quad 1331$$

Installment is same for all three years.

Total amount

$$= (1210 + 1100 + 1000)$$

$$= 3310 \text{ units}$$

Installment = 1331 units

According to the question,

$$1331 \text{ units} = ₹ 5324$$

$$1 \text{ unit} = \frac{5324}{1331} = 3310 \text{ units}$$

$$= \frac{5324}{1331} \times 3310 = ₹ 13240$$

$$71. (d) \text{ Rate} = 12\frac{1}{2}\%$$

$$= \frac{1 \rightarrow \text{CI}}{8 \rightarrow \text{Principal}}$$

$$= \frac{9 \rightarrow \text{Amount}}{8 \rightarrow \text{Principal}}$$

Total price = ₹ 20,000

Remaining price after down payment

$$= (20,000 - 5000) = ₹ 15,000$$

Principal	Installment
$8_{\times 81}$	$9_{\times 81}$
$64_{\times 9}$	$81_{\times 9}$
512	729

Note : Installment is same for all three years.

Total principal
= (648 + 576 + 512)

= 1736 units

Installment = 729 units

According to the question,

1736 units = 15000

$$1 \text{ unit} = \frac{15000}{1736}$$

$$729 \text{ units} = \frac{15000}{1736} \times 729$$

$$= 6298.96$$

Required installment = ₹ 6299

72. (d) Principal = ₹ 34,370

$$\text{Rate} = 10\% = \frac{1}{10}$$

$$= \frac{11}{10} \rightarrow \text{Installment}$$

$$= \frac{11}{10} \rightarrow \text{Principal}$$

Principal	Installment
$10_{\times 121}$	$11_{\times 121}$
$100_{\times 11}$	$121_{\times 11}$
1000	1331

$$\therefore A = \frac{B}{2} \text{ and } C = \frac{3}{4}B$$

So, A : B : C = 2 : 4 : 3

1st IInd IIIrd

Ratio of installment : 2 : 4 : 3

Principal	Installment
$1210_{\times 2}$	$1331_{\times 2}$
$1100_{\times 4}$	$1331_{\times 4}$
$1000_{\times 3}$	$1331_{\times 3}$

$$\therefore \text{Total principal} = 2420 + 4400 + 3000 = ₹ 9820$$

1st : 2nd : 3rd

Installment 2662 : 5324 : 3993

According to the question

9820 units = ₹ 34370

$$1 \text{ unit} = \frac{34370}{9820} = ₹ 3.5$$

Ist Installment = 2662 × 3.5
= ₹ 9317

$$\text{IInd Installment} = 5324 \times 3.5$$

$$= ₹ 18635$$

$$\text{IIIrd Installment} = 3993 \times 3.5$$

$$= ₹ 13975.5$$

73. (b) Rate = 5%

$$= \frac{1}{20} \rightarrow \text{C.I}$$

$$= \frac{1}{20} \rightarrow \text{Principal}$$

$$= \frac{21}{20} \rightarrow \text{Amount}$$

$$= \frac{21}{20} \rightarrow \text{Principal}$$

Principal	Amount
20	21
20	21
400	441

According to the question,

400 units = Rs. 2100

$$1 \text{ unit} = \frac{2100}{400}$$

$$441 \text{ units} = \frac{2100}{400} \times 441 = 2315.25$$

Required Amount
= Rs. 2315.25

Alternate

Effective Rate %

$$= 5 + 5 + \frac{5 \times 5}{100} = 10.25\%$$

$\therefore$ Required amount

$$= \frac{2100}{100} \times 110.25 = ₹ 2315.25$$

74. (c)

Note: In this question you have to check options.

Option (c): Principal = 1400, Rate = 10%

$$\text{Rate \%} = \frac{1}{10} = \frac{11 \rightarrow \text{amount}}{10 \rightarrow \text{principal}}$$

Principal	Amount
10	11
10	11
100	121
$\downarrow \times 14$	$\downarrow \times 14$
1400	1694

$\therefore$ Required principal
= Rs. 1400

Required Rate % = 10%

Hence option (c) is correct.

75. (a) Rate % = 5% for 2 years

$$\text{CI for 2 years} = 5 + 5 + \frac{5 \times 5}{100}$$

$$= 10.25\%$$

$$\text{SI for 2 years} = 5 \times 2 = 10\%$$

$$\text{Difference in (CI - SI)} = 0.25\%$$

According to the questions,
Required difference

$$= \frac{2000}{100} \times 0.25$$

Required difference = Rs. 5

76. (a) Sum = Rs. 20,000

CI for 2 years

$$= 20 + 20 + \frac{20 \times 20}{100} = 44\%$$

$$\text{SI for 2 years} = 23 + 23 = 46\%$$

Difference in (SI - CI)

$$= 46\% - 44\% = 2\%$$

$$\text{Difference} = \frac{20000 \times 2}{100}$$

$$= ₹ 400$$

77. (a) Rate % = 20%, Time
= 18 months

Principal = ₹ 1000

According to questions,

Interest is compounded half - yearly

$$\text{New rate \%} = \frac{20}{2} = 10\% = \frac{1}{10}$$

$$\text{New time} = 18 \times 2 = 36 \text{ months}$$

$$= 3 \text{ half years}$$

	Principal	Amount
Ist year	10	11
IInd year	10	11
IIIrd year	10	11
	1000	1331
		+331

1000 units = 1000

1 units = ₹ 1

331 units = ₹ 331

Alternate

$$10 + 10 + \frac{10 \times 10}{100}$$

= 21% (for two year)

$$3 \text{ years CI} = 21 + 10 + \frac{21 \times 10}{100}$$

$$= 33.1\%$$

$$\text{CI} = \frac{1000 \times 33.1}{100} = \text{₹ } 331$$

78. (a) CI for 2 year = Rs. 420

$$\text{Rate} = 10\% \text{ p.a.} = \frac{1}{10}$$

$$= \frac{11 \rightarrow \text{Amount}}{10 \rightarrow \text{Principal}}$$

Principal	Amount
Ist year 10	11
IInd year 10	11
100	121
+21	

According to question,
21 units = Rs. 420

$$1 \text{ unit} = \frac{420}{21}$$

$$100 \text{ units} = \frac{420}{21} \times 100$$

$$= \text{Rs. 2000}$$

Required Principal = Rs. 2000

Alternate

$$\text{Rate} = 10\%$$

$$\text{Effective rate for 2 years} = 10$$

$$+10 + \frac{10 \times 10}{100} = 21\%$$

According to the question,
21% of sum = Rs. 420

$$1\% \text{ of sum} = \frac{420}{21}$$

$$\text{sum} = \frac{420}{21} \times 100 = \text{Rs. 2000}$$

79. (d)

$$\text{Rate} = 16\frac{2}{3}\%, \frac{1 \rightarrow \text{CI}}{6 \rightarrow \text{Principal}}$$

$$\frac{7 \rightarrow \text{Amount}}{6 \rightarrow \text{Principal}}$$

Principal	Amount
6	7
36	49
↓ × 4	↓ × 4
144	196

Required principal = ₹144

80. (b) According to the question,
Principal : Amount

$$3\sqrt{1331} : 3\sqrt{1728}$$

For first year

$$11 : 12$$

$$+1$$

$$\text{Rate \%} = \frac{1}{11} \times 100 = \frac{100}{11}$$

$$= 9.09\%$$

81. (a) Let time = t years

$$\text{Rate \%} = 6\%$$

According to the question,

Interest is compounded half yearly.

$$\therefore \text{New Rate \%} = \frac{6}{2} = 3\%$$

$$\text{New time} = 2t \text{ half years}$$

$$3399 = 3300 \left(1 + \frac{3}{100}\right)^{2t}$$

$$\frac{3399}{3300} = \left(1 + \frac{3}{100}\right)^{2t}$$

$$\left(\frac{103}{100}\right)^1 = \left(\frac{103}{100}\right)^{2t}$$

$$t = \frac{1}{2} \text{ years}$$

$$= 6 \text{ months.}$$

Alternate

Note: To save your valuable time in such type of questions go through options.

Option (a) t = 6 months

$$\text{Rate} = 6\% \text{ per annum}$$

$$\text{for 6 months} = 3\%$$

$$\text{Principal} \quad 3300 \xrightarrow{+3\%} \text{Amount} \quad 3399$$

Alternate

$$= \frac{3399}{3300}$$

$$= \frac{103}{100} \xrightarrow{+3} \text{Total amount}$$

$$\xrightarrow{\text{Principal amount}}$$

$$\Rightarrow \text{increase 3 of 100}$$

$$= \frac{3}{100} \times 100 = 3\%$$

$\therefore R = 6\% \text{ per annum and increase in amount is } 3\%$

$$\therefore 3\% = \frac{6}{2}\%$$

$\therefore$ Then time will become half year

$$= \frac{1}{2} = \text{half year} = 6 \text{ months}$$

82. (a) t = 3 years, Principal = ₹ 10,000

$$\text{Amount} = ₹ 17,280$$

Note: To save your valuable time try to solve such type of questions on the basis of ratio.

$$\text{Principal} \quad \text{Amount}$$

$$10,000 : 17,280$$

$$3\sqrt{10,00} : 3\sqrt{1728}$$

$$10 : 12$$

$$+2$$

$$\text{Rate} = \frac{2}{10} \times 100 = 20\%$$

83. (a) Principal = Rs. 8000, Rate % = 12%

$$t = 15 \text{ months}$$

According to the question,

Interest is payable quarterly.

$$\therefore \text{New Rate \%} = \frac{12}{4} = 3\%$$

$$\text{New time} = \frac{15}{12} \times 4 = 5 \text{ quarter years}$$

$$\text{Amount} = 8000$$

$$\times \left(\frac{103}{100} \times \frac{103}{100} \times \frac{103}{100} \times \frac{103}{100} \times \frac{103}{100}\right)$$

$$\text{Amount} = \text{Rs. 9274.2}$$

84. (c) According to the question

Initial	Last
Ist year 10	9
2nd year 10	9
3rd year 10	9
1000	729
↓ × 40	↓ × 40
40,000	29160

$$\text{Initial population}$$

$$= 40,00085.$$

85. (a) Principal = Rs. 50,000

Rate = 12%, time = $2\frac{1}{2}$ years

According to the question,
Interest is payable half - yearly.

$$\therefore \text{New rate} = \frac{12}{2} = 6\%$$

New time = $\frac{5}{2} \times 2 = 5$ half years

Amount = 50,000

$$\times \frac{106}{100} \times \frac{106}{100} \times \frac{106}{100} \times \frac{106}{100} \times \frac{106}{100}$$

Amount = **Rs. 66911.27**

86. (c) Principal = ₹100,000,

t = 2 years, rate = 12%

According to the question,

Interest is payable half - yearly

New time = $2 \times 2 = 4$ half years

New rate = $\frac{12}{2} = 6\%$

Amount = 100,000

$$\times \frac{106}{100} \times \frac{106}{100} \times \frac{106}{100} \times \frac{106}{100}$$

Amount = **₹ 126247.69**

87. (d) SI for 2 years = $2 \times 5 = 10\%$

$$\text{CI for 2 years} = 5 + 5 + \frac{5 \times 5}{100} = 10.25$$

Difference in rates

$$= (10.25 - 10)\% = 0.25\%$$

According to the question,

$$0.25\% = 25$$

Required sum(100%)

$$= \frac{25}{0.25} \times 100 = ₹ 100,00$$

88. (a) Rate = 5%

$$= \frac{1}{20} \rightarrow \text{CI} = \frac{21}{20} \rightarrow \text{Amount}$$

Principal : Installment

$$\frac{20 \times 21}{400} = \frac{21 \times 21}{441}$$

Note: Installment is equal for both years

Total principal = 420 + 400

= 820 units

Installment = 441 units

According to the question,

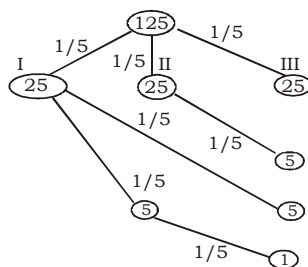
441 units = ₹ 882

$$1 \text{ unit} = \frac{882}{441} = ₹ 2$$

820 units = $2 \times 820 = ₹ 1640$

89. (c) Rate of interest = $20\% = \frac{1}{5}$

Let principal = $(5)^3 = 125$ units



Difference in (CI - SI) = $5 \times 3 + 1 = 16$ units

According to the question,

$$16 \text{ units} = ₹ 48$$

$$1 \text{ unit} = ₹ 3$$

$$125 \text{ units} = 3 \times 125 = ₹ 375$$

Alternate:

$$3 \text{ years SI} = 3 \times 20 = 60\%$$

$$3 \text{ years CI} = 44 + 20 + \frac{44 \times 20}{100}$$

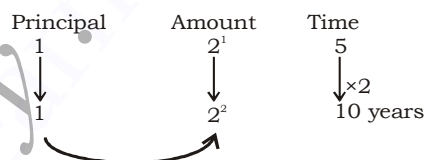
$$= 72.8\%$$

$$\text{Difference} = (72.8 - 60) = 12.8\%$$

$$\text{Required sum} = \frac{48}{12.8} \times 100$$

$$= ₹ 375$$

90. (b)



Required time = 10 years

Alternate:-

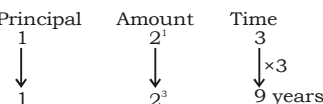
Required time = power $\times$ time

$\therefore 4 = 2^2$ and time is 5 year so,

Required time

$$= 2 \times 5 = 10 \text{ years}$$

91. (a)



Required time = 9 years

Alternate: $\rightarrow$ Let principal = ₹ P and time = t years

$$\text{Case (i)} \quad 2P = P \left(1 + \frac{r}{100}\right)^3$$

..... (i)

$$\text{Case (ii)} \quad 8P = P \left(1 + \frac{r}{100}\right)^t$$

..... (ii)
from (i) and (ii)

$$\left(1 + \frac{r}{100}\right)^t = \left[\left(1 + \frac{r}{100}\right)^3\right]^3$$

$$\left(1 + \frac{r}{100}\right)^t = \left(1 + \frac{r}{100}\right)^9$$

comparing both sides,

Hence t = 9 years

92. (a) Let the principal = ₹100

and Rate % = 10%

CI for 2 years = 21% = ₹ 21

SI for 2 years = 20% = ₹ 20

So the possible answer is ₹ 20

93. (a) Rate % = $4\% = \frac{1}{25}$

$$= \frac{26}{25} \rightarrow \text{Rakesh (share)}$$

$$= \frac{25}{25} \rightarrow \text{Bhuvnesh (share)}$$

Difference in time period of

Rakesh Yadav and Bhuvnesh =

$$(9 - 7) = 2 \text{ years}$$

Ratio of shares of Rakesh Yadav

: Bhuvnesh

$$= \left(\frac{26}{25}\right)^2 = \frac{676}{625}$$

According to the question,

$$(676 + 625) \text{ units} = ₹ 3903$$

$$1301 \text{ units} = 3903$$

$$1 \text{ unit} = \frac{3903}{1301} = ₹ 3$$

share of Rakesh Yadav

$$= 3 \times 676 = ₹ 2028$$

share of Bhuvnesh = 3×625

$$= ₹ 1875$$

94. (a) Rate of interest = 2%

time = 3 years

$$\text{SI for 3 years} = 2 \times 3 = 6\%$$

$$\text{CI for 3 years} = 6.1208\%$$

$$\left[2 + 2 + \frac{2 \times 2}{100} = 4.04\% \text{ [for 2 years]}\right]$$

$$\left[4.04 + 2 + \frac{4.04 \times 2}{100} = 6.1208\% \text{ (for 3 years)}\right]$$

Difference (CI - SI)

$$= (6.1208 - 6)\% = 0.1208\%$$

According to the question,

$$0.1208\% \text{ of sum} = 604$$

$$\text{Sum} = \frac{604}{0.1208} \times 100$$

$$\text{Sum} = 5,00,000$$

95. (c) SI for 3 years = 10.5×3
 = 31.5%
 CI for 3 years = 33.1%
 Difference in (CI - SI)
 = $(33.1 - 31.5)\% = 1.6\%$

$$\text{Difference} = 1000 \times \frac{1.6}{100} = ₹16$$

$$\text{Required difference} = ₹16$$

96. (d) Rate = 10%

$$= \frac{1}{10} \rightarrow \text{CI}$$

$$= \frac{1}{10} \rightarrow \text{Principal}$$

Principal	Amount
Ist year 10	11
IInd year 10	11
IIIrd year 10	11
1000	1331
$\times 1$	$\times 1$
1000	1331

According to the question,

Principal	:	Amount
$\sqrt[3]{1728}$	:	$\sqrt[3]{1331}$
12	:	11
	-	
	1	

$$\text{Rate \%} = \frac{1}{12} \times 100 = \frac{25}{3}\%$$

Difference in rate of CI and depreciation rate

$$= 10\% - \frac{25}{3}\% = \frac{5}{3}\%$$

97. (d) Rate = 10%,
 Principal = ₹ 64000,
 t = 1 year

According to the question,

Note:-

Interest is payable quarterly

- ∴ New rate = $\frac{10}{4} = 2.5\% = \frac{1}{40}$
 New time = $1 \times 4 = 4$ quarter years

Principal	Amount
Ist year 40	41
IInd year 40	41
IIIrd year 40	41
IVth year 40	41
2560000	2825761
	+265761

$$2560000 \text{ units} = ₹ 64000$$

$$1 \text{ unit} = \frac{64000}{2560000}$$

$$265761 \text{ units}$$

$$= \frac{64000}{2560000} \times 265761$$

$$\text{Required CI} = ₹ 6644.02$$

98. (c) **Note** : In such type of questions assume any value of rate percent then

We can check the options.

$$\text{Let Rate (R)} = 10\%$$

- Case (i):** When interest is payable at half yearly.

$$\text{New time} = 2 \times 2 = 4 \text{ half years}$$

$$\text{Effective rate of interest for 4 years} = 21.55\%$$

$$\therefore \text{Amount} = 100 + 100 \times \frac{21.55}{100}$$

$$= 121.55$$

- Case (ii):** When interest is payable annually

According to the question,

$$\therefore \text{New Rate} = S\%$$

$$121.55 = 100 \left(1 + \frac{S}{100} \right)^2$$

$$\frac{121.55}{100} = \left(1 + \frac{S}{100} \right)^2$$

$$\Rightarrow S = 10.25\% \text{ per annum}$$

So, we can say that $R < S$.

99. (a) Rate = 10%, time = 3 years
 SI for 3 years = $3 \times 10 = 30\%$

According to the question,

$$30\% \text{ of sum} = ₹ 300$$

$$\text{Sum} = \frac{300}{30} \times 100 = ₹ 1000$$

$$\therefore \text{CI for 3 years} = 33.1\%$$

$$\text{CI} = 1000 \times \frac{33.1}{100} = ₹ 331$$

100. (b) Rate = 10%, time = 3 years

$$\text{SI for 3 years} = 10 \times 3 = 30\%$$

$$\text{CI for 3 years} = 33.1\%$$

$$\text{Difference in rate \%}$$

$$= (33.1 - 30)\% = 3.1\%$$

According to the question,

$$3.1\% \text{ of sum} = ₹ 620$$

$$\text{sum} = \frac{620}{3.1} \times 100$$

$$\text{sum} = ₹ 20,000$$

101. (a) Sum = ₹ 8000,

$$\text{Rate \%} = 5\% = \frac{1}{20} \rightarrow \text{Interest}$$

$$\rightarrow \text{Principal}$$

Principal	Installment
20 $\times 441$	$\rightarrow 21 \times 441$
400 $\times 21$	$\rightarrow 441 \times 21$
8000	$\rightarrow 9261$

Note: Installment is same for all the three years

$$\text{Total Principal} = 8820 + 8400 + 8000$$

$$= ₹ 25220 \text{ units}$$

$$\text{Installment} = 9261 \text{ units}$$

According to the question,

$$25220 \text{ units} = ₹ 8000$$

$$1 \text{ unit} = ₹ \frac{8000}{25220}$$

$$9261 \text{ units} = ₹ \frac{8000}{25220} \times 9261 =$$

$$₹ 2937.67$$

102. (a) Principal = ₹ 6750, t = 3 years

$$\text{Rate} = 6\frac{2}{3}\%$$

$$= \frac{1}{15} \rightarrow \text{CI}$$

$$= \frac{16}{15} \rightarrow \text{Amount}$$

Principal	Amount
15 $\rightarrow$	16
15 $\rightarrow$	16
15 $\rightarrow$	16
3375	4096
	+721

According to the question,

$$3375 \text{ units} = ₹ 6750$$

$$1 \text{ unit} = ₹ \frac{6750}{3375} = ₹ 2$$

$$721 \text{ units} = 721 \times 2 = ₹ 1442$$

103. (a) Principal = ₹ 125000,

$$\text{Rate} = 8\%,$$

$$t = 9 \text{ months}$$

According to the question,

Note: Interest is payable quarterly,

$$\therefore \text{New rate} = \frac{8}{4} = 2\%$$

$$= \frac{1 \rightarrow \text{Interest}}{50 \rightarrow \text{Principal}}$$

Time = 9 months = 3 quarter years

Principal	Amount
50	51
50	51
50	51
125000	132651

125000 units = ₹ 125000

$$1 \text{ unit} = \frac{125000}{125000} = ₹ 1$$

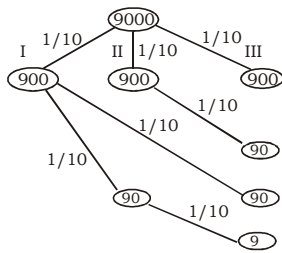
7651 units = ₹ 7651

∴ required interest = ₹ 7651

104. (a) Principal = ₹ 9000, Rate % =

$$10\% = \frac{1}{10}$$

$$\text{time} = 2 + \frac{4}{12} = 2\frac{1}{3} \text{ years}$$



Interest for $\frac{1}{3}$ year

$$= \frac{1089}{12} \times 4 = 363$$

Total interest
= $900 \times 2 + 90 + 363$
= ₹ 2253

Note: Because four months is $\frac{1}{3}$ of one year.

So, we will calculate the total CI of third year and multiply it by $\frac{1}{3}$.

105. (a) Rate = 8%, $t = 2$ years

Effective rate % of CI for 2 years

$$= 8 + 8 + \frac{8 \times 8}{100} = 16.64\%$$

Effective rate % of SI for 2 years = $2 \times 8 = 16\%$

According to the question,

$$\begin{aligned} \text{Required SI} &= \frac{2080}{16.64} \times 16 \\ &= ₹ 2000 \end{aligned}$$

106. (a) Principal = ₹ 800, Rate = 10%

Amount = ₹ 926.10,

Let time = t years

According to the question,

Note: Interest is payable half-yearly

$$\therefore \text{New rate \%} = \frac{10}{2} = 5\%$$

New time = $2t$ half years

$$926.10 = 800 \left(1 + \frac{5}{100}\right)^{2t}$$

$$\frac{92610}{80000} = \left(\frac{21}{20}\right)^{2t}$$

$$\left(\frac{21}{20}\right)^3 = \left(\frac{21}{20}\right)^{2t}$$

Comparing both sides,
 $2t = 3$,

$$t = \frac{3}{2} \text{ years}$$

107. (a) SI for 2 years = ₹ 160

$$\text{SI for 1 years} = ₹ \frac{160}{2} = ₹ 80$$

Difference in CI-SI for 2 years
= $(170 - 160) = ₹ 10$

Hence required rate %

$$= \frac{10}{80} \times 100 = 12\frac{1}{2}\% \text{ p.a.}$$

108 (a) Rate % = $8\% = \frac{2}{25}$,

time = 2 years

Initial	Final
25	27
25	27
625	729
$\times 20$	$\times 20$
12500	14580

Required price = ₹ 12500

Alternate

$$\text{CI\%} = 8 + 8 + \frac{8 \times 8}{100} = 16.64\%$$

Total Amount = $(100 + 16.64) = 116.64\%$

According to the question,

$$116.64 = 14580$$

then

$$(P) 100\% = \frac{14580}{116.64} \times 100$$

= Rs. 12500

109. (a) $R_1 = 4\% = \frac{1}{25}$, $R_2 = 5\% = \frac{1}{20}$, $R_3 = 6\% = \frac{3}{50}$

Principal	Amount
Ist year 25	26
IInd year 20	21
IIIrd year 50	53

$$\frac{25000}{28938} \xrightarrow{+3938}$$

According to the question,

25000 units = ₹ 10,000

$$1 \text{ unit} = ₹ \frac{10,000}{25000} = ₹ \frac{2}{5}$$

$$3938 \text{ units} = \frac{2}{5} \times 3938 = ₹ 1575.20$$

110. (a) Principal = ₹ 16000, Rate = 20%1

Time = 9 months

According to the question,

Note: Interest is payable quarterly

$$\text{New rate \%} = \frac{20}{4} = 5\%$$

$$\text{New time} = \frac{9 \times 4}{12} = 3 \text{ quarter years}$$

Effective rate % of CI for 3 years = 15.7625%

Required CI

$$= 16000 \times \frac{15.7625}{100}$$

Required CI = ₹ 2522

Alternate: Rate = 5%,

time = 3 quarter years

Principal	Amount
20	21
20	21
20	21
8000	9261

$$\frac{8000}{9261} \xrightarrow{+1261}$$

8000 units = ₹ 16000

1 unit = ₹ 2

$$1261 \text{ units} = 2 \times 1261 = ₹ 2522$$

Required CI = ₹ 2522

Alternate

In such of case of quarter year rate

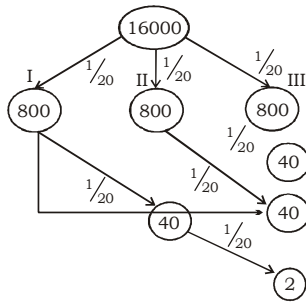
is become $\frac{1}{4}$ th times and become 4 times.

$$(9 \text{ months} = \frac{9}{12} = \frac{3}{4})$$

new rate is $\frac{20}{4} = 5\%$ and new

time is $4T = 4 \times \frac{3}{4} = 3$

$$\text{Rate} = 5\% = \frac{5}{100} = \frac{1}{20}$$



Total CI = Rs. 2522

111.(a) Time = 3 years

Rate% = 15%

$$= \frac{3 \rightarrow \text{CI}}{20 \rightarrow \text{P}} = \frac{23 \rightarrow \text{Amount}}{20 \rightarrow \text{Principal}}$$

Principal	:	Amount
Ist year 20	:	23
IInd year 20	:	23
IIIrd year 20	:	23
8000	:	12167

+4167

According to the Question,
4167 units = 6500.52

$$1 \text{ unit} = \frac{6500.52}{4167}$$

8000 units

$$= \frac{6500.52}{4167} \times 8000 = ₹12480$$

112.(d) Let the principal=1 unit

Principal	Amount	Time
1	2	5
	$\downarrow$	$\downarrow \times 4$
	$2^4 = 16$	20 years

$\therefore$ The principal will become 16 times.

$$\therefore \text{Required amount} = 12000 \times 16 = ₹ 192000$$

$$\mathbf{113.(d)} \text{ Rate} = 5\% = \frac{1}{20}$$

$$= \frac{21 \rightarrow \text{Amount}}{20 \rightarrow \text{Principal}}$$

Principal	:	Amount(Installment)
20×21	:	21×21
400	:	441

Note: Installment is same for both years.

$$\therefore \text{Total amount} = 420 + 400 = 820 \text{ units}$$

Installment = 441 units

According to the question,
820 units = ₹1025

$$1 \text{ unit} = ₹ \frac{1025}{820}$$

$$441 \text{ units} = ₹ \frac{1025}{820} \times 441 = ₹ 551.25$$

Required installment
= ₹ 551.25

114.(c) According to the question,

Initial (height)	Final (height)
8	9
8	9
64	81
$\downarrow \times 1$	$\downarrow \times 1$
64	81

$\therefore$ Required height of tree
= 81 cm

115.(b) Principal = ₹400,
Amount = ₹441

Principal	Amount
$\sqrt[3]{400}$	$\sqrt[3]{441}$
20	21
	$\downarrow +1$

Required Rate %

$$= \frac{1}{20} \times 100 = 5\%$$

116.(c) Let principal = 1 unit

Principal	Amount	Time
1	2^1	n
	$\downarrow$	$\downarrow \times 2$
	2^2	$2n$ years

117.(b) Principal = ₹6000,
Amount = ₹ 7986

time = 3 years

Ratio of Amount and

$$\text{principal} = \frac{7986}{6000} = \frac{1331}{1000}$$

Principal	:	Amount
$\sqrt[3]{1000}$	:	$\sqrt[3]{1331}$
10	:	11
		$\downarrow +1$

Required Rate %

$$= \frac{1}{10} \times 100 = 10\%$$

Note:- Because time is 3 years
so, root is 3.

118. (a) Rate % = 20%

$$= \frac{1 \rightarrow \text{Interest}}{5 \rightarrow \text{Principal}} = \frac{6 \rightarrow \text{Amount}}{5 \rightarrow \text{Principal}}$$

Principal	Amount
5	6
5	6
5	6
5	6
625	1296
	$\downarrow$ more than two times

$\therefore$ Hence required time = 4 years

119.(b) $R_1 = 8\% = \frac{2}{25}$, $R_2 = 10\%$

$$= \frac{1}{10}, R_3 = 12\% = \frac{3}{25}$$

Principal	Amount
Ist year 25	27
IInd year 10	11
IIIrd year 25	28
6250	8316
	$\downarrow$ 2066

According to the question,

$$6250 \text{ units} = ₹ 5000$$

$$1 \text{ unit} = ₹ \frac{5000}{6250}$$

$$2066 \text{ units} = ₹ \frac{5000}{6250} \times 2066$$

$$= ₹ 1652.80$$

120.(b) Let the Principal = 1 unit

According to the question,

Principal 1	Amount 2	Time 5 years
		$\times 4$
	$\downarrow$	$\downarrow$
	$2^4 = 16 \text{ times}$	20 years

Hence the sum will be 16 times in 20 years

$$\therefore \text{Required amount} = 16 \times 2400$$

$$= ₹ 38400$$

121.(b) Rate % = 20%

$$= \frac{1}{5} = \frac{6}{5} \rightarrow \text{Amount}$$

$$= \frac{1}{5} = \frac{6}{5} \rightarrow \text{Principal}$$

Principal	Amount (Installment)
$\frac{5 \times 6}{25}$	$\frac{6 \times 6}{36}$
25	36

Note: Installment is same for both years.

$$\text{Total Principal} = 30 + 25 = 55 \text{ units}$$

$$\text{Installment} = 36 \text{ units}$$

According to the question,

$$55 \text{ units} = ₹ 550$$

$$1 \text{ unit} = ₹ 10$$

$$36 \text{ units} = ₹ 10 \times 36 = ₹ 360$$

$$\therefore \text{Required value of Installment} = ₹ 360$$

122.(b) Rate % = 20%

Effective Rate of compound interest when interest is payable half yearly

$$= 10 + 10 + \frac{10 \times 10}{100} = 21\%$$

$$\text{Effective Rate of SI} = 20\%$$

$$\text{Difference in Rates}$$

$$= (21 - 20) = 1\%$$

$$\text{Difference} = \frac{6000 \times 1}{100} = ₹ 60$$

123.(c) Let the principal = ₹ P

According to the question,

Principal P	Amount (A ₁)	Time (A ₂)
	8988.8	9528.128
	$\uparrow$	$\uparrow$
	2 year	1 year

Note: To save your valuable time try to solve such type of questions on the basis of ratio.

$$\frac{A_2}{A_1} = \frac{9528.128}{8988.8} = \frac{53}{50}$$

$$\therefore P \times \frac{53}{50} \times \frac{53}{50} = 8988.8$$

$$P = \frac{8988.8 \times 50 \times 50}{53 \times 53} = ₹ 8000$$

Required rate %

$$= \left(\frac{53 - 50}{50} \right) \times 100$$

$$\text{Required Rate \%} = 6\%$$

124.(d) CI for two years = ₹ 2257.58

$$\text{SI for two years} = ₹ 2100$$

$$\text{SI for 1 year} = \frac{2100}{2} = ₹ 1050$$

$$\text{Difference in (CI - SI)}$$

$$= (2257.58 - 2100) = ₹ 157.58$$

Required Rate %

$$= \frac{157.58}{1050} \times 100 = 15.008$$

$$= 15\% (\text{appr.})$$

$$\text{Effective Rate of SI for 2 years}$$

$$= 15 \times 2 = 30\%$$

$$30\% \text{ of Sum} = ₹ 2100$$

$$\text{Sum} = \frac{2100}{30} \times 100 = ₹ 7000$$

$$\therefore \text{Hence sum} = ₹ 7000, \text{ Rate} = 15\%$$

125.(c) According to the question,

2nd year CI	3rd year CI
21780	23958
	$\uparrow$
	+2178

Required Rate %

$$= \frac{2178}{21780} \times 100 = 10\%$$

126.(d) Principal = ₹ 800, Rate = 10%

Amount after 1 year

$$= 800 + 800 \times \frac{10}{100}$$

$$= 800 + 80 = ₹ 880$$

He paid 400 at the end of the first year.

$\therefore$ Remaining amount

$$= (880 - 400) = ₹ 480$$

Amount for the 2nd year

$$= 480 \times \frac{11}{10} = ₹ 528$$

127.(c) Principal for next month

$$= (440 - 200) = 240$$

According to the question,

He paid ₹ 244 after one month.

$$\therefore \text{Interest} = (244 - 240) = ₹ 4$$

Required Rate %

$$= \frac{4}{240} \times \frac{100}{1} \times 12$$

$$= 20\% \text{ per annum}$$

128.(c) Principal for first and second month

$$= 600 - 300 = ₹ 300$$

According to the question,

He paid ₹ 360 after two months.

$$\therefore \text{Interest} = (360 - 300) = ₹ 60$$

Required rate %

$$= \frac{60}{300} \times \frac{100}{2} \times 12 = 120\%$$

129.(d) Principal for 1st month

$$= (2400 - 1000) = ₹ 1400$$

Money paid by Rakesh Yadav = ₹ 1600

$$\text{Interest} = ₹ (1600 - 1400)$$

$$= ₹ 200$$

Required Rate %

$$= \frac{200}{1400} \times \frac{100}{1} \times 12 = \frac{1200}{7}$$

$$= 171 \frac{3}{7} \%$$

130.(a) Sum = ₹ 390200, Rate, 4% =

$$\frac{1}{25} = \frac{26}{25} \rightarrow \text{Amount}$$

$$\frac{1}{25} = \frac{26}{25} \rightarrow \text{Principal}$$

Principal	Amount
$\frac{25 \times 676}{625}$	$\frac{26 \times 676}{676}$
625.26	676.26
15625	17576

Note: Installment is same for three years so making installment equal.

$$\therefore \text{Total principal} = 16900 + 16250$$

$$+ 15625 = 48775 \text{ units}$$

$$(\text{Installment}) \text{ amount}$$

$$= ₹ 17576 \text{ units}$$

According to the question,

$$48775 \text{ units} = ₹ 390200$$

$$1 \text{ unit} = ₹ \frac{390200}{48775}$$

$$17576 \text{ units} = \frac{390200}{48775} \times 17576$$

$$\text{Required value of installment} = ₹ 140608$$

131.(b) Value of installment
= ₹17576

Interest is payable quarterly.

$$\therefore \text{New rate \%} = \frac{16}{4} = 4\% = \frac{1}{25}$$

$$= \frac{26}{25} \rightarrow \text{Installment}$$

$$= \frac{26}{25} \rightarrow \text{Principal}$$

Principal	Amount
25×676	26×676
625×26	676×26
15625	17576

Note: Installment is same for all years

$\therefore$ Total principal

$$= 16900 + 16250 + 15625$$

$$= 48775 \text{ units}$$

$$\text{Installment} = 17576 \text{ units}$$

According to the question,

$$17576 \text{ units} = ₹17576$$

$$1 \text{ units} = ₹1$$

$$48775 \text{ units} = ₹48775$$

$$\text{Required principal} = ₹48775$$

Interest charged

$$= (17576 \times 3 - 48775)$$

$$= 52728 - 48775 = \text{Rs. } 3953$$

132.(c) Interest is payable half yearly

$$\therefore \text{New Rate \%} = \frac{40\%}{3 \times 2} = \frac{1}{15}$$

Principal	Amount (Installment)
15×256	16×256
225×16	256×16
3375	4096

Note: Installment is same for all years

$\therefore$ Total principal

$$= 3840 + 3600 + 3375$$

$$= 10815 \text{ units}$$

$$\text{Installment} = 4096 \text{ units}$$

According to the question,

$$10815 \text{ units} = ₹10815$$

$$1 \text{ unit} = ₹1$$

$$\therefore 4096 \text{ units} = 1 \times 4096$$

$$= ₹4096$$

$$\therefore \text{Required value of installment} = ₹4096$$

133.(b) Rate % = 15%

$$= \frac{3}{20} \rightarrow \text{Interest}$$

$$= \frac{3}{20} \rightarrow \text{Principal}$$

$$\frac{23}{20} \rightarrow \text{Amount}$$

$$\frac{23}{20} \rightarrow \text{Principal}$$

Principal	Amount (Installment)
20×529	23×529
400×23	529×23
8000	12167

Note: Installment is same for all years.

$$\therefore \text{Total principal} = 10580 + 9200 + 8000$$

$$= 27780 \text{ units}$$

$$\text{Amount (installment)} = 12167 \text{ units}$$

According to the question,

$$12167 \text{ units} = ₹486680,$$

$$1 \text{ unit} = ₹ \frac{486680}{12167}$$

$$\Rightarrow 27780 \text{ units}$$

$$= \frac{486680}{12167} \times 27780$$

$$= ₹1111200$$

$\therefore$ Sum borrowed by Bhuvnesh

$$= ₹1111200$$

134.(d) Let the principal is P_1 and P_2 Respectively

Case (i) : on According to SI

Principal	Amount
P_1	65000
+6% 6 years	

Case (ii): On according to CI

Principal	Amount
P_2	65000
+6% 6 years	

Note: On the basis of following given data we conclude $CI > SI$.

$$\therefore P_1 > P_2$$

So option (d) is correct.

135.(b) According to the question,
P and Q invest same amount.

$\therefore$ Let amount invest by P and Q is ₹ x

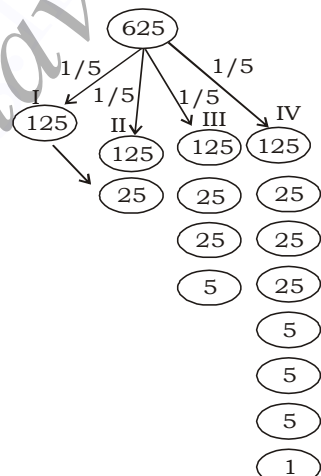
Rate % = 6%

$$\frac{\text{P's amount}}{\text{Q's amount}} = \frac{x \times 136 \times (100)^6}{100 \times (106)^6 \times x}$$

$$= \frac{136}{100} \times \left(\frac{100}{106}\right)^6 = \frac{68}{53} \times 100^5$$

136. (b) Rate % = 20% = $\frac{1}{5}$

Let principal = $(5)^4 = 625$ units



$$\frac{100 \left[\left(1 + \frac{r}{100} \right)^3 - 1 \right]}{r} = \frac{364}{100}$$

Now take help from options and satisfy the above equation,

Option (c), $r = 20\%$

$$\frac{100 \left(\frac{216}{125} - 1 \right)}{20} = \frac{91}{25}$$

$$\frac{100 \times 91}{125 \times 20} = \frac{91}{25}$$

$$\frac{91}{25} = \frac{91}{25}$$

Now Both sides are equal hence option (c) is correct.

Alternate

Note: In such type of questions take help from options to save your valuable time.

Option (c) Rate% = 20%

3 years CI = 72.8%

1 year SI = 20%

$$\text{Ratio} = \frac{72.8}{20} = \frac{728}{200} = 3.64$$

The same value is given in question hence option (c) is correct.

138.(b) CI for 2 years = ₹756

SI for 2 years = ₹720

$$\text{SI for 1 year} = \frac{720}{2} = ₹360$$

Difference in (CI-SI)
= (756 - 720) = Rs. 36

$$\text{Rate \%} = \frac{36}{360} \times 100 = 10\%$$

$$\text{Required sum} = \frac{720}{(10 \times 2)} \times 100 = ₹3600$$

₹3600

According to the question,
Time (t) = Rate (R)

$$\frac{3600 \times R \times R}{100} = 900$$

$$\Rightarrow R^2 = 25\% \Rightarrow R = 5\%$$



139.(b) Note : In such type of question assume principal as per your need, the question data doesn't matter

Let Principal = ₹100

Rate = 30% p.a.

(given)

SI for 3 years = 90%

SI for 3 years

$$= 100 \times \frac{90}{100} = ₹90$$

CI for 3 years = 119.7%

$$\text{CI for 3 years} = 100 \times \frac{119.7}{100} = ₹119.7$$

Required %

$$= \frac{(119.7 - 90)}{90} \times 100$$

$$= \frac{29.7}{90} \times 100 = \mathbf{33\%}$$



04

SIMPLE INTEREST

Simple Interest

SI is nothing but the fixed percentage of the principal (invested/borrowed/amount of money).

Some key words

- ❑ **Principal (P)** : It is the sum of money deposited/loaned e.t.c. also known as "Capital".
- ❑ **Interest** : It is the money paid by the borrower, calculated on the basis of Principal.
- ❑ **Time (T/n)** : This is the duration for which money is lent/borrowed.
- ❑ **Rate of Interest (r/R)** : It is the rate at which the interest is charged on principal.

Amount (A) = Principal + Interest

Some Basic Formulae

- ❑ **Simple Interest (SI):**

$$SI = \frac{P \times R \times T}{100}$$

P = Principal, r = rate of interest (in %)
t = time period (yearly, half yearly etc.)

$$\therefore \text{Amount (A)} = P + SI = P + \frac{prt}{100} = P \left(1 + \frac{rt}{100} \right)$$

Some Useful Short-cut Methods :

1. If a certain sum in T years at R % per annum amounts to Rs. A, then the sum will be

$$P = \frac{100 \times A}{100 + (R \times T)}$$

2. If a certain sum is invested in n types of investments in such a manner that equal amount is

obtained on each investment where interest rates are $R_1, R_2, R_3, \dots, R_n$ respectively and time periods are $T_1, T_2, T_3, \dots, T_n$ respectively, then the ratio in which the amounts are invested is :

$$\frac{1111}{100R_1T_1 + 100R_2T_2 + 100R_3T_3 + \dots + 100R_nT_n}$$

3. If a certain sum of money becomes n times itself in T years at a simple interest, then the rate of interest per annum is

$$R = \frac{100(n-1)}{T} \%$$

4. If a certain sum of money becomes n times itself in T years at a simple interest, then the time T in which it will become m times itself is given by

$$T' = \frac{(m-1)}{(n-1)} \times T$$

5. Effect of change of P, R and T on simple interest is given by the following formulae :

Change in Simple Interest

$$= \frac{\text{Product of fixed parameters}}{100} \times$$

[difference of variable parameters]

For example, if rate (R) changes from R_1 to R_2 and P and T are fixed, then

$$\text{Change in S.I.} = \frac{PT}{100} \times (R_1 - R_2)$$

Similarly, if principal (P) changes from P_1 to P_2 and R and T are fixed, then change in

$$S.I. = \frac{RT}{100} \times (P_1 - P_2)$$

Also, if rate (R) changes from R_1 to R_2 and time (T) changes from T_1 to T_2 but principal (P) is fixed, then change in

$$S.I. = \frac{P}{100} \times (R_1T_1 - R_2T_2)$$

6. If a certain sum of money P lent out at S.I. amounts to A_1 in T_1 years and to A_2 in T_2 years, then

$$P = \frac{A_1T_2 - A_2T_1}{T_2 - T_1}$$

$$\text{and, } R = \frac{A_1 - A_2}{A_2T_1 - A_1T_2} \times 100$$

7. If a sum P_1 lent at simple interest rate of $R_1\%$ per annum and another sum P_2 at simple interest rate of $R_2\%$ per annum, then the rate of interest for the whole sum is :

$$R = \left(\frac{P_1R_1 + P_2R_2}{P_1 + P_2} \right)$$

8. When there is a change in principal (P), rate (R) and time (T), then the value of simple interest (I) also changes and is given by

$$\frac{I_1}{I_2} = \frac{P_1 \times R_1 \times T_1}{P_2 \times R_2 \times T_2}$$

$$\Rightarrow \frac{A_1 - P_1}{A_2 - P_2} = \frac{P_1 \times R_1 \times T_1}{P_2 \times R_2 \times T_2}$$

$$I_1 = A_1 - P_1 \text{ and } I_2 = A_2 - P_2$$

9. Out of a certain sum P, $\frac{1}{a}$ part is

invested at $R_1\%$, $\frac{1}{b}$ part at $R_2\%$ and the remainder

$\left(1 - \frac{1}{a} - \frac{1}{b} \right)$ say $\frac{1}{c}$ part at $R_3\%$. If



the annual income from all these investments is Rs A, then the original sum is given by

$$P = \left(\frac{A \times 100}{\frac{R_1}{a} + \frac{R_2}{b} + \frac{R_3}{c}} \right)$$

1. A Sum of Rs. 4000 is lent for 5 years at the rate of 15% per annum. Find the interest.

- (a) Rs. 3000 (b) Rs. 2000
(c) Rs. 1000 (d) Rs. 1500
(e) None of these

Sol. (a) $S.I = \frac{P \times R \times T}{100}$

$P \rightarrow 4000$

$R \rightarrow 15\%$

$T \rightarrow 5 \text{ years}$

So, $S.I. = \frac{4000 \times 15 \times 5}{100} = \text{Rs. } 3000$

Alternate

Here, $r = 15\%$

$t = 5 \text{ years}$

Therefore the interest will be $(15 \times 5) = 75\%$ of the sum

Thus, Interest = $\frac{4000 \times 75}{100}$

= Rs. 3000

2. If the simple interest on Rs. 625 increases by Rs. 25 when the time increases by 2 years. Find the rate percent per annum.

- (a) 2% (b) 3%
(c) 1% (d) 0.5%
(e) None of these

Sol. (a) Here, the extra interest

$\left(\frac{25}{625} \times 100 \right) = 4\%$ of the sum.

Since, the increased time is two years therefore the extra interest would be $(2 \times r)\%$ of the sum (where r is the rate of interest)

Now,

We can conclude that $(2 \times r)\% = 4\%$

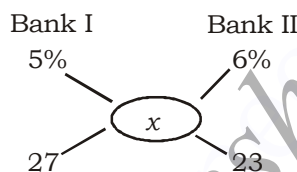
$\therefore r = 2\%$

3. A man deposits Rs. 1350 in a bank at 5% per annum and Rs. 1150 in another bank at 6% per annum. Find the rate of interest for the whole sum.

- (a) 5.40% (b) 6.40%
(c) 5.46% (d) 111%
(e) None of these

Sol. (c) Here the ratio of investments is $1350 : 1150 = 27 : 23$

Now, using Alligation method



Where x is the rate of interest for the whole sum.

Now, $x = \frac{5 \times 27 + 6 \times 23}{(27 + 23)}$
 $= \frac{(135 + 138)}{50} = \frac{273}{50}$
 $= 5.46\%$

4. The simple interest on a sum of money is $\frac{4}{9}$ of the principal, and the number of years is equal to the rate per cent per annum. Find the rate per cent.

- (a) $6\frac{2}{3}\%$ (b) $5\frac{3}{5}\%$
(c) $7\frac{2}{3}\%$ (d) $6\frac{1}{3}\%$
(e) None of these

Sol. (a) From the given statement in the question part we can conclude that ratio of sum and interest is 9: 4.

and, Rate % = Time = x

In the above case interest is $x^2\%$ of the sum i.e.

$= \frac{9 \times x^2}{100} = 4$

$x^2 = \frac{4 \times 100}{9}$

$x = \frac{20}{3} = 6\frac{2}{3}$

Thus, the required rate of interest is $6\frac{2}{3}\%$

5. If the simple interest on Rs. 1350 be more than the interest on Rs. 1250 by Rs. 20 in 2 years, find the rate percent per annum.

- (a) 5% (b) 10%
(c) 6% (d) 8%
(e) None of these

Sol. (b) $1250 + 100$

2 years — 20
1 year — 10

$R = \frac{10}{100} \times 100$
 $= 10\%$

Alternate

We know that Rs. 20 is the interest for 2 years on the sum $(1350 - 1250) = \text{Rs. } 100$

Hence, the required rate of Interest = $\frac{20 \times 100}{100 \times 2} = 10\%$

6. If the simple interest on Rs. 375 increases by Rs. 75, when the rate % increases by 5% per annum. Find the time.

- (a) 2 years (b) 8 years
(c) 4 years (d) 9 years
(e) None of these

Sol. (c) Here the extra interest = Rs.

$75 \text{ Rate} = \frac{75}{375} \times 100 = 20\%$ of the sum.

Now, we have $5 \times t = 20$

$\therefore t = \frac{20}{5} = 4 \text{ years}$

7. What annual installment will discharge a debt of Rs. 4,200 due in 5 years at 10% simple interest?

- (a) Rs. 700 per year
(b) Rs. 350 per year
(c) Rs. 750 per year
(d) Rs. 650 per year
(e) None of these



Sol. (a) Installment =

$$\frac{\text{Principal} \times 100}{100 \times t + (t_{n-1} + t_{n-2} + t_{n-3} + \dots) \times R\%}$$

$$P = 4200$$

$$T = 5 \text{ years}$$

$$R\% = 10\%$$

then According to the question

Installment

$$= \frac{4200 \times 100}{100 \times 5 + (4 + 3 + 2 + 1) \times 10}$$

$$= \frac{4200 \times 100}{600} = \text{Rs. } 700$$

8. In what time does a sum of money become thrice at the simple interest rate of 8% per annum?

- (a) 30 years (b) 15 years
(c) 20 years (d) 25 years
(e) None of these

Sol. (d) $T = \frac{n-1}{R} \times 100$

$$= \frac{3-1}{8} \times 100$$

$$= \frac{2}{8} \times 100 = 25 \text{ years}$$

Alternate

Here, the ratio of the sum and the amount is 1: 3 Therefore, the ratio of the sum and the interest would be 1: 2

Now, we have

$$\text{Amount} = 3$$

$$\text{Principal} = 1$$

$$\text{Interest} = 2$$

$$\text{Rate} = 8\%$$

$$\text{Time} = ?$$

Note that the interest is $\left(\frac{2}{1} \times 100\right)$

$$= 200\% \text{ of the sum.}$$

$$\text{Now, we get } 8 \times t = 200$$

$$\therefore t = \frac{200}{8} = 25 \text{ years}$$

9. A certain sum is invested for a certain time period. It amounts to Rs. 400 at 10% per annum. But when invested at 4% per annum, it amounts to Rs. 200. Find the time.

- (a) 100 years (b) 75 years
(c) 50 years (d) 60 years
(e) None of these

Sol. (c) Assume Time = T years

According to the question,

$$P \left(1 + \frac{10t}{100}\right) = 400 \quad \dots\dots(i)$$

$$P \left(1 + \frac{4t}{100}\right) = 200 \quad \dots\dots(ii)$$

From (i) and (ii)

$$100 + 10t = 200 + 8t$$

$$2t = 100$$

$$t = 50 \text{ years}$$

10. Ramesh borrows Rs. 7000 from a bank after 3 years he returns Rs. 3000 and after 5 years by returning Rs. 5450 closes the account. Find the rate of interest :

- (a) 5 % (b) 4%
(c) 2% (d) 6%

Sol. (a) Actual P = Rs. 7000

Total money returned = Rs. 8450

S.I. = Rs. 1450

SI of 3 years on 7000 will be Equal to SI of 1 year on 21000

SI of 2 years on 4000 will be Equal to SI of 1 year on 8000

$$21000 + 8000 = 29000$$

$$\frac{29000 \times R \times 1}{100} = 1450$$

$$R = 5 \%$$

11. A sum was put on SI at a certain rate for 3 years. Had it been put at 4% higher rate, it would have fetched Rs. 600 more, Find the sum.

- (a) Rs. 5000 (b) Rs. 4000
(c) Rs. 6000 (d) Rs. 3000
(e) None of these

Sol. (a) Extra Interest = $4 \times 3 = 12\%$

$$\text{Hence, sum} = \frac{600}{12} \times 100 = \text{Rs. } 5000$$

12. A certain sum of money amounts to Rs. 550 in 3 years and to Rs. 650 in 4 years. Find the sum.

- (a) Rs. 250 (b) Rs. 300
(c) Rs. 150 (d) Rs. 350
(e) None of these

Sol. (a) Amount for 3 years = Rs. 550

Amount for 4 years = Rs. 650

SI for 1 year = Rs. 100

Then, SI for 3 years = 300

Therefore, sum 550 - 300

Sum = Rs. 250

13. A sum was put at SI at a certain rate for 4 years. Had it been put at 5% lower rate, it would have fetched Rs. 100 less. Find the sum.

- (a) Rs. 500 (b) Rs. 5000
(c) Rs. 400 (d) Rs. 4000
(e) None of these

Sol. (a) According to the question, Rs. 100 is $(4 \times 5) = 20\%$ of the sum.

$$\text{Hence, sum} = \frac{100 \times 100}{20} = \text{Rs. } 500$$

14. Anish borrowed Rs. 15000 at the rate of 12% and another amount at the rate of 15% for two years. The total interest paid by him was Rs. 9000. How much did he borrow?

- (a) Rs. 32000 (b) Rs. 33000
(c) Rs. 30000 (d) Rs. 63000
(e) None of these

Sol. (b) Here,

$$\frac{15000 \times 12 \times 2}{100} + \frac{x \times 15 \times 2}{100} = 9000$$

$$3600 + \frac{3}{10}x = 9000$$

$$x = \frac{(9000 - 3600) \times 10}{3}$$

$$= \frac{5400 \times 10}{3} = \text{Rs. } 18000$$



Hence the total borrowed amount = $15000 + 18000 = \text{Rs. } 33000$

15. At a certain rate of simple interest Rs. 400 amounted to Rs. 460 in 3 years. If the rate of interest is decreased by 3%, what will be the amount after 3 years?
- (a) Rs. 424 (b) Rs. 484
(c) Rs. 242 (d) Rs. 484
(e) None of these

Sol. (a) S.I = Rs. 400 $\frac{3 \text{ years}}{3\%}$ 460
(amount)

$$\text{Interest} = \frac{400 \times 9\%}{100} = \text{Rs. } 36$$

$$\text{New amount required} = 460 - 36 = \text{Rs. } 424$$

Alternate

The required new amount
= $460 - (3 \times 3)\% \text{ of } 400$
= $460 - 36 = \text{Rs. } 424$

16. Rs. 1,200 amounts to Rs. 1,632 in 4 years at a certain rate of simple interest. If the rate of interest is increased by 1%, it would amount to how much?
- (a) Rs. 1635 (b) Rs. 1644
(c) Rs. 1670 (d) Rs. 1680
(e) None of these

Sol. (d) Rs. 1200 $\frac{4 \text{ years}}{+1\%}$ Rs. 1632
Interest = $1200 \times (4 \times 1)\%$
= Rs. 48

$$\text{The required new amount} = 1632 + 48 = \text{Rs. } 1680$$

Alternate

The required new amount
= $1632 + (4 \times 1)\% \text{ of } 1200$
= $1632 + 48 = \text{Rs. } 1680$

17. The simple interest on a sum of money will be Rs. 150 after 4 years. In the next 4 years principal becomes 5 times, what will be the total interest at the end of the 8th year?

- (a) Rs. 950 (b) Rs. 850
(c) Rs. 900 (d) Rs. 860
(e) None of these

Sol. (c) In 4 Years

$$P \rightarrow \text{Rs. } 150$$

In next four Years

$$\text{Principal} = 5 \times 150 = \text{Rs. } 750$$

$$\text{Total Interest at the end of 8 years} = 750 + 150 = \text{Rs. } 900$$

Alternate

$$\text{Total interest at the end of 8 years} = 150 + 5 \times 150 = \text{Rs. } 900$$

18. The simple interest on a sum of money will be Rs. 225 after 3 years. In the next 5 years principal becomes 3 times what will be the total interest at the end of the 8th year?

- (a) Rs. 1250 (b) Rs. 1330
(c) Rs. 1360 (d) Rs. 1350
(e) None of these

Sol. (d)

Sum	Time	Interest
P	3 years	Rs. 225
P	1 year	Rs. 75
3P	1 year	Rs. 225
3P	5 years	Rs. 1125

Hence the total interest at the end of 8 years would be $225 + 1125 = \text{Rs. } 1350$

19. A sum of Rs. 1521 is lent out in two parts in such a way that the interest on one part at 10% for 5 years is equal to that on another part at 8% for 10 years. Find the two sums.

- (a) Rs. 926, Rs. 595
(b) Rs. 906, Rs. 615
(c) Rs. 916, Rs. 605
(d) Rs. 936, Rs. 585
(e) None of these

Sol. (d) Total $\rightarrow 1521$

$$\begin{array}{l} \swarrow \quad \searrow \\ P_1 \times 10\% \times 5 \quad P_2 \times 8\% \times 10 \\ \frac{P_1}{P_2} = \frac{8}{5} \end{array}$$

$$13 \text{ Units} = \text{Rs. } 1521$$

$$1 \text{ Unit} = \text{Rs. } 117$$

$$P_1 \rightarrow 8 \times 117 = \text{Rs. } 936$$

$$P_2 \rightarrow 5 \times 117 = \text{Rs. } 585$$

20. A sum of money becomes two times at the simple interest rate of 2% per annum. At what rate per cent will it become five folds?

- (a) 10% (b) 8%
(c) 6% (d) 9%
(e) None of these

$$\text{Sol. (b) } T = \frac{\frac{n-1}{R} \times 100}{\text{times}} = \frac{2-1}{2} \times 100$$

$$T = 50 \text{ years}$$

$$R\% = \frac{5-1}{50} \times 100 = 8\%$$

21. A certain sum of money amounts to Rs. 5000 in 5 years at 10% per annum. In how many years will it amount to Rs. 6000 at the same rate?

- (a) 8 years (b) 6 years
(c) 10 years (d) 9 years
(e) None of these

Sol. (a) Here the amount = Rs. 5000 is $(100 + 5 \times 10)\%$ of the sum. Therefore, the amount = Rs. 6000

would be $\left(\frac{150}{5000} \times 6000 \right) = 180\%$ of sum where interest is equal to 80% of the sum. Thus we get $10 \times t = 80$
 $\therefore t = 8 \text{ years}$

22. What principal will amount to Rs. 560 in 3 years at rate of 4 percent per annum simple interest?

- (a) Rs. 540 (b) Rs. 500
(c) Rs. 550 (d) Rs. 560
(e) None of these

Sol. (b) Total interest = $(100 + 3 \times 4)\%$
Hence, sum = $\frac{560 \times 100}{112} = \text{Rs. } 500$

23. A person lent a certain sum of money at 4% simple interest, and in 5 years the interest amounted to Rs. 520 less than the sum lent. Find the sum lent.

- (a) Rs. 600 (b) Rs. 650
(c) Rs. 700 (d) Rs. 750
(e) None of these



Sol. (b) Here Rs. 520 is $(100 - 4 \times 5)\%$ of the sum.

$$\begin{aligned}\text{Hence sum} &= \frac{520 \times 100}{80} \\ &= \text{Rs. } 650\end{aligned}$$

24. A sum of money double itself in 5 years. It will become 4 times itself in

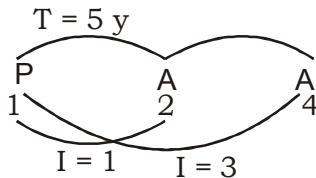
- (a) 10 years (b) 12 years
(c) 15 years (d) 20 years
(e) None of these

Sol. (a) $\frac{T_1}{T_2} = \frac{n_1 - 1}{n_2 - 1}$

$$\frac{T_1}{5} = \frac{4 - 1}{2 - 1}$$

$$T_1 = 15 \text{ years}$$

वैकल्पिक



1 ₹ → 5 years

↓

3 ₹ → 15 years Ans

25. The simple interest on Rs. 1250 will be less than the interest on Rs. 1400 at 3% simple interest by Rs. 45. Find the time.

- (a) 10 years (b) 9 years
(c) 8 years (d) 6 years
(e) None of these

Sol. (a) $\frac{1400 \times 3 \times t}{100} - \frac{1250 \times 3 \times t}{100} = 45$

$$\frac{4200t - 3750t}{100} = 45$$

$$450t = 4500$$

$$t = 10 \text{ years}$$

26. The difference in simple interests on a certain sum at 4% per annum for 3 years and at 5% per annum for 2 years is Rs. 50. Find the sum.

- (a) Rs. 5000 (b) Rs. 4000
(c) Rs. 3000 (d) Rs. 2500
(e) None of these

Sol. (d) $\frac{P \times 4 \times 3}{100} - \frac{P \times 5 \times 2}{100} = 50$

$$\frac{12P - 10P}{100}$$

$$2P = \text{Rs. } 5000$$

$$1P = \text{Rs. } 2500$$

27. The difference between the interest received from two different banks on Rs. 200 for 3 years is Rs. 60. Find the difference between their rates.

- (a) 5% (b) 7%
(c) 10% (d) 9%
(e) None of these

Sol. (c) $200 \times 3 \times R_1 - 200 \times 3 \times R_2 = 60 \times 100$

$$(R_1 - R_2) = 10\%$$

28. A sum of money lent out at simple interest amounts to Rs. 720 in 2 years and to Rs. 1020 in 7 years. Find the rate percent per annum.

- (a) 10% (b) 12%
(c) 5% (d) 15%
(e) None of these

Sol. (a) $\begin{array}{c} \text{2 years} \quad \quad \quad \text{5 years} \\ \text{P} \text{ --- Rs. } 720 \text{ --- Rs. } 1020 \\ \quad \quad \quad \quad \quad \quad \text{Rs. } 300 \end{array}$

$$\text{S.I. for 5 years} = \text{Rs. } 300$$

$$\text{S.I. for 1 year} = \text{Rs. } 60$$

$$\text{S.I. for 2 years} = \text{Rs. } 120$$

$$\text{Therefore, Rate} = \frac{120 \times 100}{600 \times 2} = 10\%$$

29. Out of a certain sum, $\frac{1}{3}$ rd is

invested at 3%, $\frac{1}{6}$ th at 6% and the rest at 8%. If the simple interest for 2 years for all these investments amounts to Rs. 600, find the original sum.

- (a) Rs. 5000 (b) Rs. 6000
(c) Rs. 5200 (d) Rs. 5500
(e) None of these

Sol. (a) Suppose the sum is Rs. 600

Parts of sum	Rate	Interest
$600 \times \frac{1}{3} = 200$	3%	Rs. 6
$600 \times \frac{1}{6} = 100$	6%	Rs. 6
Remaning = 300	8%	Rs. 24
		Rs. 36

Thus, we can conclude that the interest for two years for the sum of Rs. 600 is $(36 \times 2 =)$ Rs. 72. Thus, the required sum

$$= \frac{600 \times 600}{72} = \text{Rs. } 5,000$$

30. The simple interest on Rs. 400 for 5 years together with that on Rs. 600 for 4 years came to Rs. 132, the rate being the same in both the cases. Find the rate percent of interest.

- (a) 1% (b) 5%
(c) 4% (d) 3%
(e) None of these

Sol. (d) $\frac{400 \times R \times 5}{100} + \frac{600 \times R \times 4}{100} = 132$

$$4400R = 13200$$

$$R\% = \frac{132}{44} = 3\%$$

31. If y is the simple interest on x and z is the simple interest on y , the rate % and the time being the same in both the cases, what is the relation between x , y and z ?

- (a) $x^2 = yz$ (b) $y^2 = xz$
(c) $z^2 = xy$ (d) $xyz = 1$
(e) None of these

Sol. (b) According to the question,

$$y = \frac{x \times R \times T}{100} \quad \dots\dots I$$

$$z = \frac{y \times R \times T}{100} \quad \dots\dots II$$

$$\frac{I}{II} = y^2 = xz$$

32. A sum of money becomes $\frac{7}{6}$ of itself in 3 years at certain rate of simple interest. The rate per annum is :



- (a) $5\frac{5}{9}\%$ (b) $6\frac{5}{9}\%$

- (c) 18 % (d) 25 %

Sol. (a) Let the principal = P

$$\therefore \text{Amount} = \frac{7P}{6}$$

$$\text{S.I.} = \frac{7P}{6} - P = \frac{P}{6}$$

$$\therefore R = \frac{\text{S.I.} \times 100}{P \times T} = \frac{P \times 100}{6 \times P \times 3} = \frac{50}{9} = 5\frac{5}{9}\%$$

Alternate

Let principal = 6 $\rightarrow$ interest = 7 - 6 = 1
and Amount = 7 (for 3 years)

$$\therefore \text{Rate \% per annum} = \frac{1}{6 \times 3} \times 100 = \frac{50}{9} = 5\frac{5}{9}\%$$

[$\therefore$ Rate % is always calculated on Principal]

33. What sum of money must be given at simple interest for six months at 4 % per annum in order to earn Rs. 150 interest?
(a) Rs. 5000 (b) Rs. 7500
(c) Rs. 10000 (d) Rs. 15000

Sol. (b) $P = \frac{\text{S.I.} \times 100}{R \times T}$
 $= \frac{150 \times 100}{4 \times 6} \times 12 = \text{Rs. } 7500$

Alternate

In such case of half year rate would become half

$$R = 4\%, \text{ New rate} = \frac{4}{2} = 2\%$$

$$1\% = 75$$

$$\text{then}$$

$$100\% = 7500$$

34. A sum of Rs. 1600 gives a simple interest of Rs. 252 in 2 years and 3 months. The rate of interest per annum is :

- (a) $5\frac{1}{2}\%$ (b) 8 %

- (c) 7 % (d) 6 %

Sol. (c) Principal, P = Rs. 1600

$$\text{S.I.} = \text{Rs. } 252$$

Time = 2 years and 3 months

$$= 2\frac{3}{12} = 2\frac{1}{4} = \frac{9}{4} \text{ years}$$

$$\therefore \text{Rate \%} = \frac{\text{S.I.} \times 100}{P \times T} = \frac{252 \times 100}{1600 \times \frac{9}{4}} \times 4 = 7\%$$

35. A sum of Rs. 400 amounts to Rs. 480 in 4 years. What will its amounts if the rate of interest is increased by 2 % ?

- (a) Rs. 484 (b) Rs. 560

- (c) Rs. 512 (d) None of these

Sol. (c) Rs. 400 becomes Rs. 480 in 4 years

If the rate % is increased by 2 %, then in 4 years

$$\therefore 2\% \text{ extra for 4 years} = 4 \times 2 = 8\%$$

$$\begin{aligned} \text{Amount} &= \text{Rs. } 480 + (2 \times 4)\% \text{ of } 400 \\ &= \text{Rs. } 480 + 8\% \text{ of } 400 \\ &= \text{Rs. } 480 + 32 = \text{Rs. } 512 \end{aligned}$$

36. The simple interest on a sum of money is $\frac{4}{9}$ of the principal and

the number of years is equal to the rate percent per annum. The rate per annum is:

- (a) 5 % (b) $6\frac{2}{3}\%$

- (c) 6 % (d) $7\frac{1}{2}\%$

Sol. (b) We know that

$$\text{S.I.} = \frac{PRT}{100}$$

$$\text{Given that, S.I.} = \frac{4}{9}P$$

$$\& R = T$$

$$\therefore \frac{4}{9}P = \frac{P \times R \times T}{100}$$

$$\Rightarrow R^2 = \frac{400}{9} \Rightarrow R = \frac{20}{3} = 6\frac{2}{3}\%$$

37. In what time will the simple interest be $\frac{2}{5}$ of the principal at 8 percent per annum ?

- (a) 8 years (b) 7 years

- (c) 5 years (d) 6 years

Sol. (c) Let the principal = P and time = T

$$\therefore \text{S.I.} = \frac{2}{5}P$$

$$\therefore \text{S.I.} = \frac{P \times R \times T}{100}$$

$$\Rightarrow \frac{2}{5}P = \frac{P \times 8 \times T}{100}$$

$$\Rightarrow T = 5 \text{ years}$$

38. The simple interest on a sum after 4 years is $\frac{1}{5}$ of the sum.

The rate of interest per annum is :

- (a) 4 % (b) 5 %

- (c) 6 % (d) 8 %

Sol. (b) Let the principal = P

$$\therefore \text{S.I.} = \frac{1}{5}P, T = 4 \text{ years}$$

$$\therefore R = \frac{100 \times \text{SI}}{PT} = \frac{100 \times P}{5 \times P \times 4} = 5\%$$

Alternate

Let P = 5 $\therefore$ S.I. = 1, T = 4 years

$$\therefore \text{Rate \%} = \frac{1}{4} \times \left(\frac{1}{5}\right) \times 100 = 5\%$$

39. What sum of money will amount to Rs. 520 in 5 years and to Rs. 568 in 7 years at simple interest ?

- (a) Rs. 400 (b) Rs. 120

- (c) Rs. 510 (d) Rs. 220

Sol. (a) Amount = P + S.I. (for 5 years) = Rs. 520 in 5 years(i)

again, amount = P + S.I. (for 7 years) = Rs. 568 in 7 years(ii)

By (ii) - (i), we get 2 years S.I. = 568 - 520 = Rs. 48

$$\therefore 1 \text{ year S.I.} = \text{Rs. } 24$$

$$\therefore 5 \text{ years S.I.} = 24 \times 5 = \text{Rs. } 120$$

$$\therefore \text{from (i), } P = 520 - \text{S.I. (for 5 years)} = 520 - 120 = \text{Rs. } 400$$

40. A money lender finds that due to a fall in the annual rate of interest from 8 % to $7\frac{3}{4}\%$, his yearly income diminishes by Rs. 61.50. His capital is :



- (a) Rs. 22400 (b) Rs. 23800
(c) Rs. 24600 (d) Rs. 26000

Sol. (c) Difference in rate

$$= \left(8 - 7\frac{3}{4}\right)\% = \frac{1}{4}\%$$

Let the capital be Rs. x

$$\therefore \frac{1}{4}\% \text{ of } x = 61.25$$

$$\Rightarrow x = 61.25 \times 4 \times 100 = \text{Rs. } 24600$$

41. The simple interest on a certain sum for 8 months at 4% per annum is Rs. 129 less than the simple interest on the same sum for 15 months at 5% per annum. The sum is:

- (a) Rs. 2,580 (b) Rs. 2400
(c) Rs. 2529 (d) Rs. 3600

Sol. (d) Let the sum = Rs. 600

Case - I :

$$\text{S.I.} = \frac{600 \times 4 \times 8}{12 \times 100} = \text{Rs. } 16$$

Case - II :

$$\text{S.I.} = \frac{600 \times 5 \times 15}{12 \times 100} = \text{Rs. } 37.5$$

$$\therefore \text{Difference} = 37.5 - 16 = 21.5$$

But, the given difference = Rs. 129
i.e. 21.5 units $\longrightarrow$ 129

$$\Rightarrow 1 \text{ unit} \longrightarrow \frac{129}{21.5} = 6$$

$$\Rightarrow 600 \text{ units} \longrightarrow 6 \times 600 = 3600$$

The required sum = Rs. 3600

42. A man loses Rs. 55.50 yearly when the annual rate of interest falls from 11.5% to 10%. His capital (in rupees) is :

- (a) 3700 (b) 7400
(c) 8325 (d) 11100

Sol. (a) Difference in %

$$= 11.5\% - 10\% = 1.5\%$$

Let his capital = Rs. x

$$\therefore 1.5\% \text{ of } x = 55.5$$

$$\Rightarrow x = \frac{55.5 \times 100}{1.5} = 3700$$

Capital = Rs. 3700

43. What sum will amount to Rs.

7000 in 5 years at $3\frac{1}{3}\%$ simple

interest ?

- (a) Rs. 6300 (b) Rs. 6500
(c) Rs. 6000 (d) Rs. 5000

$$\text{Sol. (c) } P = \frac{A \times 100}{100 + RT} = \frac{7000 \times 100}{100 + \frac{10}{3} \times 5}$$

$$= \frac{7000 \times 100 \times 3}{350} = \text{Rs. } 6000$$

Alternatively:-

$$\therefore 3\frac{1}{3}\% = \frac{10}{3}\% = \frac{10}{3} \times \frac{1}{100} = \frac{1}{30}$$

$$\therefore \text{in 5 years} = \frac{1}{30} \times 5 = \frac{1}{6}$$

$$\therefore P + \frac{1}{6}P = 7000$$

$$\Rightarrow \frac{7P}{6} = 7000 \Rightarrow P = \text{Rs. } 6000$$

44. Mohan lent some amount of money at 9% simple interest and an equal amount of money at 10% simple interest, each for two years. If his total interest was Rs. 760. what amount was lent in each case?

- (a) Rs. 1700 (b) Rs. 1800
(c) Rs. 1900 (d) Rs. 2000

Sol. (d) Let the principal = P

$$\frac{P \times R_1 \times T}{100} + \frac{P \times R_2 \times T}{100} = 760$$

$$\Rightarrow \frac{P \times 9 \times 2}{100} + \frac{P \times 10 \times 2}{100} = 760$$

$$\Rightarrow 18P + 20P = 760 \times 100$$

$$\Rightarrow 38P = 760 \times 100$$

$$\Rightarrow P = \text{Rs. } 2000$$

45. If the annual rate of simple interest increases from 10%

to $12\frac{1}{2}\%$. A man's yearly

income increases by Rs. 1250.

His income (in rupees) is :

- (a) 50,000 (b) 45,000
(c) 60,000 (d) 65,000

Sol. (a) Difference in %

$$= \left(12\frac{1}{2} - 10\right)\% = 2.5\%$$

Let his Income = Rs. x

$\therefore$ According to the question,
2.5% of x = Rs. 1250

$$\Rightarrow x = \frac{1250 \times 100}{2.5} = \text{Rs. } 50,000$$

46. The sum of money, that will give Rs.1 as interest per day at the rate of 5% per annum simple interest is :

- (a) Rs. 3650 (b) Rs. 36500
(c) Rs. 730 (d) Rs. 7300

Sol. (d) S.I. = Re. 1, Rate = 5%,

$$T = 1 \text{ day} = \frac{1}{365} \text{ year}$$

$P = ?$

$$\therefore P = \frac{\text{S.I.} \times 100}{RT} = \frac{1 \times 100}{5 \times 1} \times 365 = \text{Rs. } 7300$$

47. In what time will Rs. 72

become Rs. 81 at $6\frac{1}{4}\%$ per annum simple interest ?

- (a) 2 years (b) 3 years
(c) 2 years 6 months
(d) None of these

Sol. (a) Here, $P = 72$, $\text{S.I.} = 81 - 72 = \text{Rs. } 9$,

$$R = 6\frac{1}{4}\% = \frac{25}{4}\%, T = ?$$

$$T = \frac{\text{S.I.} \times 100}{PR} = \frac{9 \times 100}{72 \times 25} \times 4$$

$$= 2 \text{ years}$$

48. The simple interest on Rs. 7,300 from 11 May, 1987 to 10 september, 1987 (both days included) at 5% per annum is:

- (a) Rs. 123 (b) Rs. 103
(c) Rs. 200 (d) Rs. 223

Sol. (a) Given, $P = \text{Rs. } 7300$, $R = 5\%$
 $T = \text{From 11 May to 10 september 1987}$

$$= 21 + 30 + 31 + 31 + 10$$

$$= 123 \text{ days} = \frac{123}{365} \text{ years}$$



$$\therefore \text{S.I.} = \frac{7300 \times 123 \times 5}{365 \times 100}$$

$$= \text{Rs. 123}$$

49. At what rate percent per annum will the simple interest on a sum of money be $\frac{2}{5}$ of the amount in 10 years ?
 (a) 4% (b) 6%
 (c) $5\frac{2}{3}\%$ (d) $6\frac{2}{3}\%$

Sol. (d) $\frac{2}{5} \rightarrow \text{S.I.}$
 $\frac{2}{5} \rightarrow \text{Amount}$

$$\Rightarrow \text{Principal} = 5 - 2 = 3$$

$$T = 10 \text{ years}$$

$\therefore$ Required rate (per annum)

$$= \frac{1}{10} \left(\frac{2}{3} \times 100 \right) = \frac{20}{3} = 6\frac{2}{3}\%$$

50. If the simple interest for 6 years be equal to 30 % of the principal, it will be equal to the principal after:

- (a) 20 years (b) 30 years
 (c) 10 years (d) 22 years

Sol. (a) Let the principle be P and rate of interest be r % p.a. According to the question,

$$\frac{30P}{100} = \frac{P \times R \times 6}{100}$$

$$\Rightarrow 30 = 6R$$

$$\Rightarrow R = 5\%$$

Now, let the interest be equal to principal in T years.

$$\therefore P = \frac{P \times 5 \times T}{100} \Rightarrow T = \frac{100}{5}$$

$$= 20 \text{ years}$$

Short-cut

$$30\% = \frac{3}{10} \rightarrow \text{S.I. (for 6 years)}$$

$$\frac{3}{10} \rightarrow \text{Principal}$$

i.e. for S.I. = 3, time required = 6 years

$\therefore$ for S.I. = 10, time required =

$$\frac{6}{3} \times 10$$

$$= 20 \text{ years}$$

51. Simple interest on Rs. 500 for 4 years at 6.25 % per annum is equal to the simple interest on Rs. 400 at 5% per annum for a certain period of time. The period of time is :

- (a) 4 years (b) 5 years

- (c) $6\frac{1}{4}$ years (d) $8\frac{2}{3}$ years

Sol. (c) Let the period of time be T years. Then,

$$\frac{400 \times 5 \times T}{100} = \frac{500 \times 4 \times 6.25}{100}$$

$$\Rightarrow T = \frac{500 \times 4 \times 6.25}{400 \times 5} = \frac{25}{4}$$

$$= 6\frac{1}{4} \text{ years}$$

52. Manoj deposited Rs. 29400 for 6 years at a simple interest. He got Rs. 4200 as interest after 6 years. The annual rate of interest was:

- (a) $2\frac{8}{21}\%$ (b) $2\frac{7}{20}\%$

- (c) $3\frac{8}{21}\%$ (d) $4\frac{8}{21}\%$

Sol. (a) Here, P = Rs. 29400, T = 6 years, S.I. = 4200, R = ?

$$\therefore R = \frac{\text{S.I.} \times 100}{PT} = \frac{4200 \times 100}{29400 \times 6} = \frac{50}{21}$$

$$= 2\frac{8}{21}\%$$

53. At what rate of simple interest per annum will a sum become $\frac{7}{4}$ of itself in 4 years ?

- (a) 18 % (b) $18\frac{1}{4}\%$

- (c) $18\frac{3}{4}\%$ (d) $18\frac{1}{2}\%$

Sol. (c) $\frac{7}{4} \rightarrow \text{Amount}$
 $\frac{4}{4} \rightarrow \text{Principal}$

$$\Rightarrow \text{S.I.} = 7 - 4 = 3$$

$$\therefore \text{Rate} = \frac{\text{S.I.} \times 100}{\text{Principal} \times \text{time}} = \frac{3 \times 100}{4 \times 4}$$

$$= \frac{75}{4} = 18\frac{3}{4}\%$$

54. Equal sums of money are lent to X and Y at 7.5 % per annum for a period of 4 years and 5 years respectively. If the difference in interest paid by them was Rs. 150, the sum lent to each was :

- (a) Rs. 500 (b) Rs. 1000
 (c) Rs. 2000 (d) Rs. 3000

Sol. (c) Let the sum lent be Rs. 100

$\therefore$ Interest given by X = $(7.5\% \times 4)$ of 100 = Rs. 30

And, Interest given by y = $(7.5\% \times 5)$ of 100 = Rs. 37.5

$\therefore$ Difference in interest = $37.5 - 30 = \text{Rs. } 7.5$

but the given difference = Rs. 150

$$\text{i.e. } 7.50 \longrightarrow 150$$

$$\therefore 100 \longrightarrow \frac{150}{7.5} \times 100 = 2000$$

i.e. the sum lent to x and y = Rs. 2000

55. In how many years will a sum of money double itself at $6\frac{1}{4}\%$ simple interest per annum ?

- (a) 24 (b) 20
 (c) 16 (d) 12

Sol. (c) Rate = $6\frac{1}{4}\%$

$$= \frac{25}{4} \times \frac{1}{100} = \frac{1}{16}$$

It means, if principal = 16, then S.I = 1 unit (per year) to double the sum i.e. $16 \times 2 = 32$

S.I. required = $32 - 16$
 = 16 units

1 unit S.I. in $\longrightarrow$ 1 year

$\therefore$ 16 units S.I. in $\longrightarrow$ $1 \times 16 = 16$ yrs

**Alternatively**

$$\begin{aligned}\text{Time} &= \frac{\text{S.I.} \times 100}{\text{Principal} \times \text{Rate}} \\ &= \frac{x \times 100}{x \times \frac{25}{4}} = 16 \text{ years}\end{aligned}$$

56. At a certain rate of simple interest, a certain sum of money becomes double of itself in 10 years. It will become triple of itself in :

(a) 15 years (b) 18 years
(c) 20 years (d) 30 years

Sol. (c) Amount = Principal + S.I.
 $2 = 1 + 1$
 $3 = 1 + 2$

i.e. 1 unit S.I. in $\longrightarrow$ 10 years
 $\therefore$ 2 units S.I. in $\longrightarrow$ 10×2
 $= 20 \text{ yrs}$

Alternatively

If principal = Rs. x and rate = r % p.a. then

Case - I

$$\begin{aligned}\text{Rate} &= \frac{\text{S.I.} \times 100}{\text{Principal} \times \text{Time}} = \frac{x \times 100}{x \times 10} \\ &= 10 \%\end{aligned}$$

Case - II

$$\begin{aligned}\therefore \text{Time} &= \frac{\text{S.I.} \times 100}{\text{Principal} \times \text{Rate}} = \frac{2x \times 100}{x \times 10} \\ &= 20 \text{ years}\end{aligned}$$

57. The simple interest on a sum of money is $\frac{1}{9}$ of the principal and the number of years is equal to rate per cent per annum. The rate per annum is :

(a) 3 % (b) $\frac{1}{3}$ %
(c) $3\frac{1}{3}$ % (d) $\frac{3}{10}$ %

Sol. (c) Let the principal (P) = Rs. 9
 $\therefore$ S.I. = Re. 1
 Rate % = Time = R

$$\therefore \text{S.I.} = \frac{\text{PRT}}{100}$$

$$\Rightarrow 1 = \frac{9 \times R \times R}{100} \Rightarrow R^2 = \frac{100}{9}$$

$$\Rightarrow R = \frac{10}{3} = 3\frac{1}{3} \%$$

58. The simple interest on a certain sum for 6 years is $\frac{9}{25}$ of the sum. The rate of interest is :

(a) 6 % (b) $6\frac{1}{2}$ %
(c) 8 % (d) $8\frac{1}{2}$ %

Sol. (a) $\frac{9}{25} \rightarrow$ S.I. (in 6 years)
 $\frac{9}{25} \rightarrow$ Principal

$$\begin{aligned}\therefore \text{Rate \% (per annum)} &= \frac{1}{6} \times \left(\frac{9}{25} \times 100 \right) = 6 \%\end{aligned}$$

59. The simple interest on a sum for 5 years is one fourth of the sum. The rate of interest per annum is :

(a) 5 % (b) 6 %
(c) 4 % (d) 8 %

Sol. (a) $\frac{1}{4} \rightarrow$ S.I. (in 5 years)
 $\frac{1}{4} \rightarrow$ Principal

$$\begin{aligned}\therefore \text{Rate \% per annum} &= \frac{1}{5} \times \left(\frac{1}{4} \times 100 \right) = 5 \%\end{aligned}$$

60. Rs. 800 becomes Rs. 956 in 3 years at a certain rate of simple interest. If the rate of interest is increased by 4%, what amount will Rs. 800 become in 3 years ?

(a) Rs. 1020.80 (b) Rs. 1025
(c) Rs. 1052 (d) Rs. 1050

Sol. (c) Required amount = Rs. 956 + (4% $\times$ 3) of 800
 $= \text{Rs. } 956 + 12 \times 8$
 $= \text{Rs. } 956 + 96 = \text{Rs. } 1052$

61. The simple interest on a certain sum is $\frac{16}{25}$ of the sum. if the rate percent and time (in years) are equal, then the rate percent is :

(a) 6 % (b) 8 %
(c) 10 % (d) 12 %

Sol. (b) $\frac{16}{25} \rightarrow$ S.I.
 $\frac{16}{25} \rightarrow$ Principal

Let Rate % = Time = R

$$\therefore \text{S.I.} = \frac{\text{PRT}}{100}$$

$$\Rightarrow 16 = \frac{25 \times R \times R}{100}$$

$$\Rightarrow R^2 = 64 \Rightarrow R = 8 \%$$

62. On a certain sum, the simple interest at the end of $6\frac{1}{4}$ years becomes $\frac{3}{8}$ of the sum. The rate of interest is:

(a) 5 % (b) 6 %
(c) 7 % (d) 8 %

Sol. (b) $\frac{3}{8} \rightarrow$ S.I. (in $6\frac{1}{4}$ years)
 $\frac{3}{8} \rightarrow$ Principal

$\therefore$ Rate % (per annum)

$$= \frac{1}{6\frac{1}{4}} \times \left(\frac{3}{8} \times 100 \right)$$

$$= \frac{4}{25} \times \frac{3}{8} \times 100 = 6 \%$$

63. Ratio of the principal and the amount after 1 year is 10 : 12. Then the rate of interest per annum is :

(a) 12 % (b) 10 %
(c) 18 % (d) 20 %

Sol. (d) Principal : Amount = 10 : 12
 $\therefore$ S.I. = 12 - 10 = 2
 $t = 1 \text{ year}$

$$\therefore \text{Rate \% p.a.} = \frac{2}{10} \times 100 = 20 \%$$

[Note : S.I. is always calculated on principal]

64. In how much time, will a sum of money becomes double of itself at 15 % per annum simple interest ?

(a) $6\frac{1}{4}$ years (b) $6\frac{1}{2}$ years

(c) $6\frac{1}{3}$ years (d) $6\frac{2}{3}$ years

Sol. (d) Rate = 15%

$$\begin{aligned}\frac{3}{20} &\rightarrow \text{S.I. (in 1 year)} \\ \frac{3}{20} &\rightarrow \text{Principal}\end{aligned}$$



To make sum double i.e. $20 \times 2 = \text{Rs. } 40$

Required S.I. = $40 - 20 = \text{Rs. } 20$

Now,

Rs. 3 S.I. obtain in $\rightarrow 1$ year

$\therefore$ Rs. 20 S.I. will obtain $\rightarrow \frac{1}{3} \times$

20 years

$= 6\frac{2}{3}$ years

i.e., the required time

$= 6\frac{2}{3}$ years

65. In how many years will a sum of Rs. 3,000 yield a simple interest of Rs. 1,080 at 12 % per annum ?

(a) 3 (b) $2\frac{1}{2}$

(c) 2 (d) $3\frac{1}{2}$

Sol. (a) Here, P = Rs. 3000, S.I. = Rs. 1080, R = 12%,
T = ?

$\therefore T = \frac{\text{S.I.} \times 100}{\text{PR}} = \frac{1080 \times 100}{3000 \times 12} = 3$ years

66. In a certain time, the ratio of a certain principal and the simple interest obtained from it are in the ratio 10 : 3 at 10 % interest per annum. The number of years the money was invested is :

(a) 1 (b) 3
(c) 5 (d) 7

Sol. (b) Principal : S.I.
= 10 : 3, Rate = 10 %
10 % of principal
= 10 % of 10 = Re. 1

i.e. Re.1 S.I. is obtained in 1 year
 $\therefore$ Rs 3 S.I. will be obtained in = $1 \times 3 = 3$ years

67. John invested a sum of money at an annual simple interest rate of 10 %. At the end of four years the sum invested plus interest earned was Rs. 770. The sum invested was :

(a) Rs. 650 (b) Rs. 350

(c) Rs. 550 (d) Rs. 500

Sol. (c) If the principal be Rs. x, then
S.I. = Rs. (770 - x)

$\therefore \text{Principal} = \frac{\text{S.I.} \times 100}{R \times T}$

$\Rightarrow x = \frac{(770 - x) \times 100}{4 \times 10}$

$\Rightarrow 2x = (770 - x) \times 5$

$\Rightarrow 7x = 770 \times 5$

$\Rightarrow x = 110 \times 5 = \text{Rs. } 550$

Short-cut

$10\% = \frac{1}{10} \rightarrow$ S.I. (in 1 year)

$10\% = \frac{1}{10} \rightarrow$ Principal

S.I. in 4 year = $1 \times 4 = \text{Rs. } 4$

$\therefore$ Amount after 4 years = $10 + 4 = \text{Rs. } 14$

But the given amount = Rs. 770

i.e. 14 units $\rightarrow 770$

$\Rightarrow 10 \text{ units} \rightarrow \frac{770}{14} \times 10 = 550$

i.e. the required sum
= Rs. 550

68. In what time will Rs. 1,860 amount to Rs. 2,641.20 at simple interest of 12 % per annum ?

(a) 3 years (b) $3\frac{1}{2}$ years

(c) 4 years (d) $4\frac{1}{2}$ years

Sol. (b) Here, P = Rs. 1860, Amount = Rs. 2641.20

$\therefore$ S.I. = $2641.20 - 1860 = \text{Rs. } 781.2$,
Rate = 12% p.a., Time = T = ?

$\therefore T = \frac{\text{S.I.} \times 100}{P \times R} = \frac{781.2 \times 100}{1860 \times 12} = 3.5$ years

69. In how many years will a sum of money doubles itself at 12 % per annum ?

(a) 3 years. 6 months

(b) 6 years. 9 months

(c) 8 years. 4 months

(d) 7 years. 6 months

Sol. (c) Rate = 12 %

$= \frac{3}{25} \rightarrow$ Interest (in 1 year)
 $\rightarrow$ Principal

To make principal double i.e.
 $25 \times 2 = 50$ units

Interest required = $50 - 25 = 25$ units

Now,

3 units S.I. is obtained in 1 year

$\therefore$ 25 units S.I. will be obtained in

$\frac{1}{3} \times 25$ years = $8\frac{1}{3}$ years

= 8 years 4 months

70. The simple interest on a certain sum at 5 % per annum for 3 years and 4 years differ by Rs. 42. The sum is :

(a) Rs. 210 (b) Rs. 280

(c) Rs. 750 (d) Rs. 840

Sol. (d) Let the sum be Rs. 100

Case-I : S.I. = $(5\% \times 3)$ of 100 = Rs. 15

Case-II : S.I. = $(5\% \times 4)$ of 100 = Rs. 20 $\rightarrow \textcircled{5}$

but the given difference = Rs. 42

i.e. 5 $\rightarrow 42$

$\therefore 100 \rightarrow \frac{42}{5} \times 100 = \text{Rs. } 840$

i.e. the required sum = Rs. 840

71. The difference between the simple interest received from two different sources on Rs. 1500 for 3 years is Rs. 13.50. The difference between their rates of interest is :

(a) 0.1 % (b) 0.2 %

(c) 0.3 % (d) 0.4 %

Sol. (c) S.I. (for 3 years) = Rs. 13.50

Principal = Rs. 1500

$\therefore$ Required difference

$= \frac{1}{3} \times \left(\frac{13.5}{1500} \times 100 \right) = \frac{0.9}{3} = 0.3\%$

Alternatively

Let R_1 and R_2 be the required rate of interest.

Then,

$13.50 = \frac{1500 \times 3 \times R_1}{100} - \frac{1500 \times 3 \times R_2}{100}$

$\Rightarrow 13.50 = \frac{4500}{100} (R_1 - R_2)$

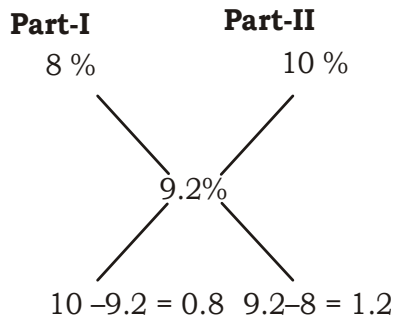
$\Rightarrow R_1 - R_2 = 0.3\%$



72. A sum of Rs. 10,000 is lent partly at 8 % p.a. and remaining at 10 % per annum. if the yearly interest on the average is 9.2 %, the two parts are :

- (a) Rs. 4000, Rs. 6000
(b) Rs. 4500, Rs. 5500
(c) Rs. 5000, Rs. 5000
(d) Rs. 5500, Rs. 4500

Sol. (a) By Alligation Rule,



∴ Amount of part-I : Amount of Part II = 0.8 : 1.2
2 : 3

$$\therefore \text{Part - I} = \frac{2}{5} \times 10000 = \text{Rs. 4000}$$

$$\& \text{ part- II} = \frac{3}{5} \times 10000 = \text{Rs. 6000}$$

73. A sum of Rs. 1550 was lent partly at 5 % p.a. and partly at 8 % p.a. simple interest. The total interest received after 3 years is Rs. 300. The ratio of money lent at 5% p.a. to that at 8 % p.a. is :

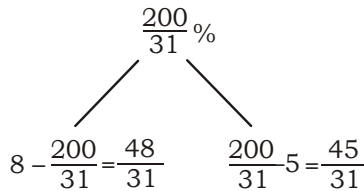
- (a) 5 : 8 (b) 8 : 5
(c) 31 : 6 (d) 16 : 15

Sol. (d) Principal = Rs. 1550
S.I. (in 3 years) = Rs. 300

∴ Rate % p.a. =

$$\frac{1}{3} \left(\frac{300}{1550} \times 100 \right) = \frac{200}{31} \%$$

By Alligation Rule,
Part-I **Part-II**
5 % 8 %



i.e. the required ratio

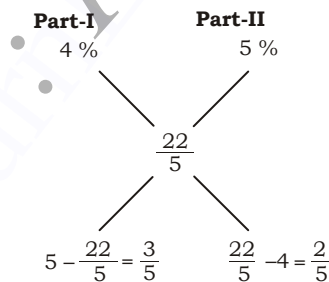
$$= \frac{48}{31} : \frac{45}{31} = 48 : 45 = 16 : 15$$

74. A person lent Rs. 5,000 partly at the rate of 4 percent p.a. and partly at the rate of 5 percent per annum simple interest. The total interest after 2 years is Rs. 440. To find the sum of money lent at each of the above rates, Rs. 5,000 is to be divided in the ratio :

- (a) 4 : 5 (b) 3 : 2
(c) 5 : 4 (d) 2 : 3

Sol. (b) Principal = Rs. 5000
S.I. (in 2 years) = Rs. 440

$$\text{Rate \%} = \frac{1}{2} \times \left(\frac{440}{5000} \times 100 \right) = \frac{22}{5} \%$$



∴ Required ratio = 3 : 2

75. A sum of Rs. 1750 is divided into two parts such that the interest on the first part at 8 % simple interest per annum and that on the other part at 6 % simple interest per annum are equal. The interest on each part (in rupees) is :

- (a) 60 (b) 65
(c) 70 (d) 40

Sol. (a) Let first part = Rs. x and second part = Rs. (1750 - x)

$$x \times \frac{8}{100} = (1750 - x) \times \frac{6}{100}$$

$$\Rightarrow 14x = 1750 \times 6$$

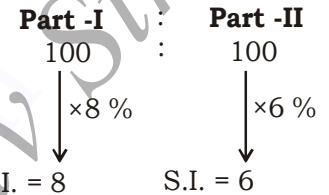
$$\Rightarrow x = \frac{1750 \times 6}{14} = \text{Rs. 750}$$

∴ Interest = 8% of Rs. 750

$$= 750 \times \frac{8}{100} = \text{Rs. 60}$$

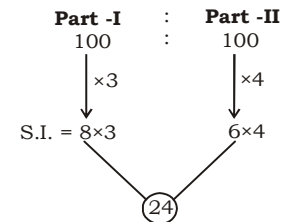
Alteranatively

let each part = Rs. 100



Given that, S.I. of both parts are equal.

To make them equal,



∴ Total amount = Rs. 300 + 400 = Rs. 700

And S.I. on each part = Rs. 24

But, the given total amount = Rs. 1750

i.e. 700 → 1750

$$\Rightarrow 24 \longrightarrow \frac{1750}{700} \times 24 = 60$$

i.e. S.I. on each part = Rs. 60

76. A lends Rs. 5000 to B for 2 years and Rs. 3000 to C for 4 years on simple interest at the same rate of interest and receives Rs. 2200 in all from both as interest. The rate of interest per annum is:

- (a) 7 % (b) 5 %
(c) $7\frac{1}{8}$ % (d) 10 %

Sol. (d) Let rate of interest = 5% p.a.

∴ Interest paid by B = (5% × 2) of 5000

= Rs. 500

And interest paid by C

= (5% × 4) of 3000

= Rs. 600



$$\therefore \text{Total interest} = 500 + 600 = \text{Rs. } 1100$$

$$\text{But the given total interest} = \text{Rs. } 2200$$

$$\text{i.e. } 1100 \longrightarrow 2200$$

$$\Rightarrow 5 \longrightarrow \frac{2200}{1100} \times 5 = 10$$

i.e. the required rate of interest per annum = 10 % p.a.

77. Rs. 500 was invested at 12 % per annum simple interest and a certain sum of money invested at 10 % per annum simple interest. If the sum of the interests on both the sums after 4 years is Rs. 480, the latter sum of money is :

- (a) Rs. 450 (b) Rs. 750
(c) Rs. 600 (d) Rs. 550

Sol. (c) S.I. gained from Rs. 500

$$= \frac{500 \times 12 \times 4}{100} = \text{Rs. } 240$$

$$\text{Remaining S.I. for 10\%} = 480 - 240 = 240$$

$$\therefore \frac{x \times 10 \times 4}{100} = 240$$

$$\Rightarrow x = \frac{240 \times 100}{40} = \text{Rs. } 600$$

78. A lends Rs. 2500 to B and a certain sum to C at the same time at 7 % annual rate of simple interest. If after 4 years A altogether receive Rs. 1120 as interest from B and C, the sum lent to C is :

- (a) Rs. 700 (b) Rs. 6500
(c) Rs. 4000 (d) Rs. 1500

Sol. (d) Let the sum lent to C be Rs. x

According to the question,

$$\frac{2500 \times 7 \times 4}{100} + \frac{x \times 7 \times 4}{100} = 1120$$

$$\text{or } 2500 + x = 4000$$

$$\Rightarrow x = \text{Rs. } 1500$$

79. A sum of money at simple interest amounts to Rs. 1,012 in

$$2\frac{1}{2} \text{ years and to Rs. } 1,067.20 \text{ in}$$

4 years. The rate of interest per annum is :

- (a) 2.5 % (b) 3 %
(c) 4 % (d) 5 %

Sol. (c) Let principal = P

$$\therefore P + \text{S.I. for 2.5 years}$$

$$= \text{Rs. } 1012 \quad \dots(i)$$

$$\text{and } P + \text{S.I. for 4 years}$$

$$= \text{Rs. } 1067.20 \quad \dots(ii)$$

By (ii) - (i),

$$\text{S.I. for 1.5 years} = \text{Rs. } 55.20$$

$$\therefore \text{S.I. for 2.5 years}$$

$$= \left(\frac{55.2}{1.5} \times 2.5 \right) = \text{Rs. } 92$$

$$\therefore \text{From (i), } P = \text{Rs. } (1012 - 92) = \text{Rs. } 920$$

$$\text{Now, } P = 920, T = 2.5, \text{S.I.} = 92$$

$$\therefore R = \frac{100 \times \text{S.I.}}{P \times T} = \frac{100 \times 92}{920 \times 2.5} = 4\%$$

80. A sum of money lent out at simple interest amounts to Rs. 720 after 2 years and to Rs. 1020 after further period of 5 years. The sum is :

- (a) Rs. 500 (b) Rs. 600
(c) Rs. 700 (d) Rs. 710

Sol. (b) Let the principal = P

$$P + \text{S.I. for 2 years} = \text{Rs. } 720$$

$$\dots(i)$$

$$P + \text{S.I. for 7 years} = \text{Rs. } 1020$$

$$\dots(ii)$$

By (ii) - (i),

$$\text{S.I. for 5 years} = \text{Rs. } (1020 - 720) = \text{Rs. } 300$$

$$\therefore \text{S.I. for 2 years} = \left(\frac{300}{5} \times 2 \right) = \text{Rs. } 120$$

$$\therefore \text{From (i), } P = \text{Rs. } (720 - 120) = \text{Rs. } 600$$

81. A certain sum of money becomes three times of itself in 20 years at simple interest. In how many years does it becomes double itself at the same rate of simple interest?

- (a) 8 years (b) 10 years
(c) 12 years (d) 14 years

Sol. (b) Principal Amount

$$1 \xrightarrow{20 \text{ years}} 3 (= 1 + 2)$$

$$1 \xrightarrow{\quad} 2 (= 1 + 1)$$

i.e. 2 units S.I. in 20 years

$\therefore$ 1 unit S.I. in 10 years

82. If the simple interest on a certain sum of money for 15 months at

$7\frac{1}{2}\%$ per annum exceeds the simple interest on the same sum

for 8 months at $12\frac{1}{2}\%$ per annum by Rs. 32.50, then the sum of money (in Rs.) is :

- (a) 312 (b) 312.50
(c) 3120 (d) 3120.50

Sol. (c) According to the question,

$$\left(7\frac{1}{2}\% \times \frac{15}{12} - 12\frac{1}{2}\% \times \frac{8}{12} \right) \text{ of principal} = \text{Rs. } 32.50$$

$$\Rightarrow \left(\frac{15}{2} \times \frac{5}{4} - \frac{25}{2} \times \frac{2}{3} \right) \text{ of}$$

$$\text{principal} = 32.50 \times 100$$

$$\Rightarrow \left(\frac{75}{8} - \frac{25}{3} \right) \text{ of principal} = 3250$$

$$\Rightarrow \text{Principal} = \frac{3250}{25 \left(\frac{3}{8} - \frac{1}{3} \right)}$$

$$= \frac{130 \times 24}{1} = \text{Rs. } 3120$$

83. A sum of Rs. 1500 is lent out in two parts in such a way that the simple interest on one part at 10 % per annum for 5 years is equal to that on another part at 12.5 % per annum for 4 years. The sum lent out at 12.5 % is :

- (a) Rs. 500 (b) Rs. 1000
(c) Rs. 750 (d) Rs. 1250

Sol. (c) Let each part = Rs. 100

Part -I : **Part -II**

100 : 100

↓ 10 % for 5 years

↓ 12.5 % for 4 years

S.I. $\rightarrow$ Rs.50

Rs.50



This shows equal S.I.s (as per the question)

$$\therefore \text{Sum lent out at } 12.5 \% = \text{Sum lent out at } 10 \%$$

$$= \frac{1500}{2}$$

$$= \text{Rs. } 750$$

Alternatively

Let the sum out at 12.5 % be Rs. x

$$\therefore \text{Sum lent out at } 10 \% = 1500 - x$$

Now,

$$\frac{(1500 - x) \times 10 \times 5}{100} = \frac{x \times 12.5 \times 4}{100}$$

$$\Rightarrow 50 (1500 - x) = 50 x$$

$$\Rightarrow 2x = 1500$$

$$\Rightarrow x = \frac{1500}{2}$$

$$= \text{Rs. } 750$$

84. A man had Rs. 16,000, part of which he lent at 4 % and the rest at 5 % per annum simple interest. If the total interest received was Rs. 700 in one year, the money lent at 4 % per annum was :

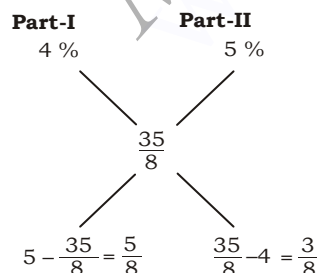
- (a) Rs. 12,000 (b) Rs. 8,000
(c) Rs. 10,000 (d) Rs. 6,000

Sol. (c) P = Rs. 16,000

$$\text{S.I. in 1 year} = 700$$

$$\therefore \text{Rate \%} = \frac{700}{16000} \times 100 = \frac{35}{8} \%$$

Now By Alligation Rule,



$$\therefore \text{Part I : part II} = 5 : 3$$

$$\therefore \text{Amount lent at } 4 \% \text{ p.a.} = \text{part I}$$

$$= \frac{5}{8} \times 16000 = \text{Rs. } 10,000$$

85. A person invests money in three different schemes for 6 years, 10 years and 12 years at 10 percent, 12 percent and 15 percent simple interest respectively. At the completion of each scheme, he gets the same interest. The ratio of his investments is :

$$(a) 6 : 3 : 2 \quad (b) 2 : 3 : 4$$

$$(c) 3 : 4 : 6 \quad (d) 3 : 4 : 2$$

Sol. (a) Required Ratio = $P_1 : P_2 : P_3$

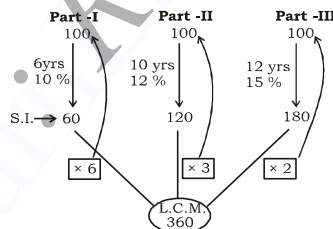
$$= \frac{1}{r_1 t_1} : \frac{1}{r_2 t_2} : \frac{1}{r_3 t_3}$$

$$= \frac{1}{6 \times 10} : \frac{1}{10 \times 12} : \frac{1}{12 \times 15}$$

$$= \frac{1}{60} : \frac{1}{120} : \frac{1}{180} = 6 : 3 : 2$$

Alternatively

Let money invested in each scheme = Rs. 100



$\therefore$ Given that S.I.s are equal

$\therefore$ Required ratio of investment

$$= 6 \times 100 : 3 \times 100 : 2 \times 100$$

$$= 6 : 3 : 2$$

86. Rs. 6,000 becomes Rs. 7,200 in 4 years at a certain rate of simple interest. If the rate becomes 1.5 times of itself, the amount for the same principal in 5 years will be :

$$(a) \text{Rs. } 8,000 \quad (b) \text{Rs. } 8,250$$

$$(c) \text{Rs. } 9,250 \quad (d) \text{Rs. } 9,000$$

Sol. (b) SI = Rs. (7200 - 6000)

$$= \text{Rs. } 1200$$

$$\therefore \text{SI} = \frac{PRT}{100}$$

$$\Rightarrow 1200 = \frac{6000 \times R \times 4}{100}$$

$$\Rightarrow R = 5 \%$$

$$\therefore \text{New rate} = 5 \times 1.5 = 7.5 \%$$

$$\text{Then, SI} = \frac{6000 \times 7.5 \times 5}{100}$$

$$= \text{Rs. } 2250$$

$$\therefore \text{Amount} = \text{Rs. } (6000 + 2250)$$

$$= \text{Rs. } 8250$$

87. With a given rate of simple interest, the ratio of principal and amount for a certain period of time is 4 : 5. After 3 years, with the same rate of interest, the ratio of the principal to amount becomes 5 : 7. The rate of interest is :

$$(a) 4 \% \quad (b) 6 \%$$

$$(c) 5 \% \quad (d) 7 \%$$

Sol. (c) Principal : Amount = 4 : 5(i)

After 3 years,

$$\text{Principal : Amount} = 5 : 7$$

....(ii)

$\therefore$ Principal will remain same, so, (i) $\times 5$ & (ii) $\times 4$, we get

$$P : A = 20 : 25$$

After 3 years,

$$P : A = 20 : 28$$

$$\text{i.e. S.I. in 3 years} = 28 - 25 = 3$$

$$\therefore \text{S.I. in 1 year} = \frac{3}{3} = 1$$

$$\therefore \text{Rate \% p.a.} = \frac{1}{20} \times 100 = 5 \%$$

88. Rs. 1,000 was invested at 5 % per annum simple interest. If the interest is added to the principal after every 10 years, the amount will become Rs. 2,000 after :

$$(a) 15 \text{ years} \quad (b) 18 \text{ years}$$

$$(c) 20 \text{ years} \quad (d) 16\frac{2}{3} \text{ years}$$

Sol. (d) After 10 years,

$$\text{SI} = \frac{1000 \times 5 \times 10}{100} = \text{Rs. } 500$$

Principal for 11 th year and next



$$= 1000 + 500 = \text{Rs. } 1500$$

$$\text{SI} = \text{Rs. } (2000 - 1500) = \text{Rs. } 500$$

$$\therefore T = \frac{\text{SI} \times 100}{P \times R} = \frac{500 \times 100}{1500 \times 5} =$$

$$\frac{20}{3} \text{ years} = 6 \frac{2}{3} \text{ years}$$

$$\therefore \text{Total time} = 10 + 6 \frac{2}{3}$$

$$= 16 \frac{2}{3} \text{ years}$$

89. A sum of money amounts to Rs. 5,200 in 5 years and to Rs. 5,680 in 7 years at simple interest. The rate of interest per annum is :

- (a) 3 % (b) 4 %
(c) 5 % (d) 6 %

Sol. (d) P + S.I. in 5 years = 5200

.....(i)

P + S.I. in 7 years = 5680(ii)

By (ii) - (i),

$$\text{S.I. in 2 years} = 5680 - 5200$$

$$= \text{Rs. } 480$$

$$\therefore \text{S.I. in 5 years} = \frac{480}{2} \times 5$$

$$= \text{Rs. } 1200$$

Now, P = 5200 - 1200 Rs. 4000,

S.I. = 1200, T = 5 years

$\therefore$ Rate %

$$= \frac{\text{S.I.} \times 100}{P \times T} = \frac{1200 \times 100}{4000 \times 5} = 6 \%$$

90. A borrows Rs. 800 at the rate of 12 % per annum simple interest and B borrows Rs. 910 at the rate of 10 % per annum simple interest. In how many years will their amounts of debt be equal?

- (a) 18 (b) 20
(c) 22 (d) 24

Sol. (c) Let the period of time be T years.

$$= 800 + \frac{800 \times 12 \times T}{100} = 910 + \frac{910 \times 10 \times T}{100}$$

$$\Rightarrow 800 + 96 T = 910 + 91 T$$

$$\Rightarrow 96 T - 91 T = 910 - 800$$

$$\Rightarrow T = \frac{110}{5} = 22 \text{ years}$$

Alternatively

$$\text{Difference of sum} = 910 - 800$$

$$= \text{Rs. } 110$$

$$12 \% \text{ of } 800 = \text{Rs. } 96 \leftarrow \textcircled{5}$$

$$\& 10 \% \text{ of } 910 = \text{Rs. } 91 \leftarrow$$

i.e. 5 rupees difference is covered in 1 year

$\therefore$ 110 rupees difference will be

$$\text{covered in } \frac{1}{5} \times 110 = 22 \text{ years.}$$

91. A person deposited Rs. 400 for 2 years, Rs. 550 for 4 years and Rs. 1,200 for 6 years. he received the total simple interest of Rs. 1,020. The rate of interest per annum is :

- (a) 10 % (b) 5 %
(c) 15 % (d) 20 %

Sol. (a) Let required rate = 5 %

$$\therefore \text{Total interest} = (5\% \times 2) \text{ of } 400$$

$$+ (5\% \times 4) \text{ of } 550 + (5\% \times 6) \text{ of } 1200$$

$$= 40 + 100 + 360$$

$$= \text{Rs. } 510$$

but the given total interest

= Rs. 1020

i.e. 510 $\longrightarrow$ 1020

$$\Rightarrow 5 \longrightarrow \frac{1020}{510} \times 5 = 10$$

i.e. the required rate = 10 %

92. A person lends 40 % of his sum of money at 15 % per annum, 50 % of rest at 10 % per annum and the rest at 18 % per annum rate of interest. What would be the annual rate of interest, if the interest is calculated on the whole sum?

- (a) 13.4 % (b) 14.33 %
(c) 14.4 % (d) 13.33 %

$$\text{Sol. (c) } 40 \% = \frac{2}{5}, 50 \% = \frac{1}{2}$$

Let total sum = 10 $\times$ LCM of (5, 2)
= Rs. 100

$\therefore$ 40 % of sum = Rs. 40

$\therefore$ Rest sum = 100 - 40 = 60

$\therefore$ 50 % of rest sum = Rs. 30

$\therefore$ Rest sum = Rs. 30

$\therefore$ Total interest = 15% of 40 + 10

$$\% \text{ of } 30 + 18 \% \text{ of } 30 = 6 + 3 + 5.4 = 14.4$$

$\therefore$ Rate of interest on whole sum

$$= \frac{14.4}{100} \times 100 = 14.4 \%$$

93. Ramesh deposited Rs. 15600 as a fixed deposit at the rate of 10 % per annum simple interest. After every second year, he adds his interest earnings to the principal. The interest at the end of the fourth year is :

- (a) Rs. 3432 (b) Rs. 3744
(c) Rs. 6864 (d) Rs. 1872

Sol. (c) S.I. earned after 2 years

$$= \frac{15600 \times 10 \times 2}{100} = \text{Rs. } 3120$$

$\therefore$ Principal for next 2 years

$$= \text{Rs. } (15600 + 3120) = \text{Rs. } 18720$$

$\therefore$ S.I. earned for next 2 years

$$= \frac{18720 \times 10 \times 2}{100} = \text{Rs. } 3744$$

$\therefore$ S.I. earned at the end of fourth year = 3120 + 3744

$$= \text{Rs. } 6864$$

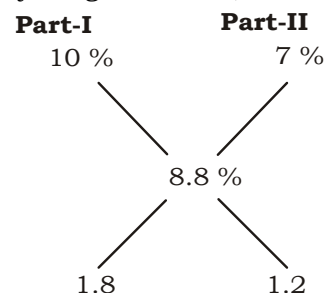
94. A part of Rs. 1500 was lent at 10 % per annum and the rest at 7 % per annum simple interest. The total interest earned in three years was Rs. 396. The sum lent at 10 % was:

- (a) Rs. 900 (b) Rs. 800
(c) Rs. 700 (d) Rs. 600

Sol. (a) P = 1500, Total interest = Rs. 396, Time = T = 3 years

$$\therefore \text{Rate \%} = \frac{396 \times 100}{1500 \times 3} = 8.8\%$$

By Alligation Rule,



$$\therefore \text{Part I : Part II} = 1.8 : 1.2 = 3 : 2$$

$$\therefore \text{Part I} = \frac{3}{5} \times 1500 = \text{Rs. } 900$$



95. A sum of money, at simple interest, triples itself in 15 years. It will become 5 times itself in:

(a) 40 years (b) 36 years
(c) 30 years (d) 25 years

Sol. (c)

Principal (P)	Amount (= P + S.I.)
1 $\longrightarrow$ 1	3 (= 1 + 2)
1 $\longrightarrow$ 1	5 (= 1 + 4)

i.e. 2 units S.I. is obtained in 15 years

$\therefore$ Rs. 4 S.I. will be obtained in $\frac{15}{2} \times$

4 = 30 years

96. Out of Rs. 50,000, that a man has, he lends Rs. 8000 at $5\frac{1}{2}\%$

per annum simple interest and Rs. 24,000 at 6 % per annum simple interest. He lends the remaining money at a certain rate of interest so that he gets total annual interest of Rs. 3680. The rate of interest per annum, at which the remaining money is lent, is :

(a) 5 % (b) 7 %
(c) 10 % (d) 12 %

Sol. (c) S.I. on Rs. 8000 = $\frac{11}{2}\%$ of

8000 = Rs. 440

S.I. on Rs. 24000 = 6 % of 24000 = Rs. 1440

Remaining amount = 50000 - 8000 - 24000 = Rs. 18000

$\therefore$ S.I. on Rs. 18000 = Rs. [3680 - (440 + 1440)] = Rs. 800

$\therefore$ Required rate = $\frac{1800}{18000} \times 100 = 10\%$

97. A man lent Rs. 60,000, partly at 5 % and the rest at 4 % simple interest. If the total annual interest is Rs. 2560, the

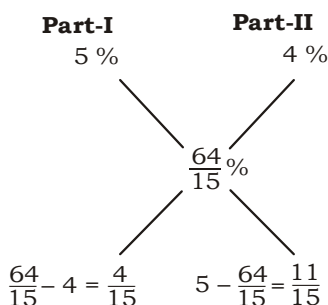
money lent at 4 % was :

(a) Rs. 40000 (b) Rs. 44000
(c) Rs. 30000 (d) Rs. 45000

Sol. (b) P = 60,000, Total interest = 2560 (in 1 year)

$$\therefore \text{Rate} = \frac{2560}{60000} \times 100 = \frac{64}{15}\%$$

By Alligation Rule,



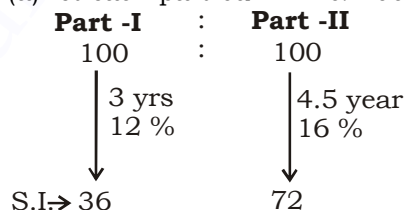
$\therefore$ Part I : Part II = 4 : 11

$\therefore$ Part II = $\frac{11}{15} \times 60,000$
= Rs. 44,000

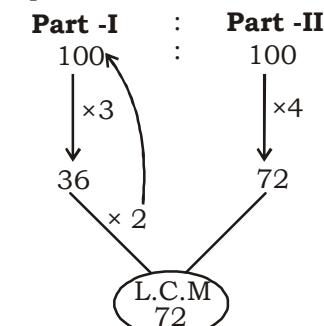
98. If Rs. 12,000 is divided into two parts such that the simple interest on the first part for 3 years at 12 % per annum is equal to the simple interest on the second part for $4\frac{1}{2}$ years at 16 % per annum, the greater part is :

(a) Rs. 8,000 (b) Rs. 6,000
(c) Rs. 7,000 (d) Rs. 7,500

Sol. (a) Let each part sum = Rs. 100



Given that S.I. of both parts are equal.



$\therefore$ Part I = $2 \times 100 = 200$
& Part II = 100

i.e. Part I : Part II = 2 : 1

$\therefore$ Greater part = part I = $\frac{2}{3} \times 12000$
= Rs. 8000

99. A sum of money at a certain rate per annum of simple interest doubles in the 5 years and at a different rate becomes three times in 12 years. The lower rate of interest per annum is:

(a) 15 % (b) 20 %

(c) $15\frac{3}{4}\%$ (d) $16\frac{2}{3}\%$

Sol. (d)

Principal (P)	Amount (= P + S.I.)
---------------	---------------------

Case-I 1 $\xrightarrow{\text{in 5 years}}$ 2 (= 1 + 1)

Case-II 1 $\xrightarrow{\text{in 12 years}}$ 3 (= 1 + 2)

in **Case - I** : Rate = $\frac{1}{1 \times 5} \times 100 =$

20 %

in **Case - II** : Rate =

$$\frac{1}{12} \times \frac{2}{1} \times 100 = \frac{100}{6} = 16\frac{2}{3}\%$$

100. A sum of money at some rate of simple interest amounts to Rs. 2,900 in 8 years and to Rs. 3,000 in 10 years. The rate of interest per annum is :

(a) 4 % (b) $2\frac{1}{2}\%$

(c) 3 % (d) 2 %

Sol. (d) P + S.I. in 8 years = Rs. 2900

.....(i)

P + S.I. in 10 years = Rs. 3000

.....(ii)

By (ii) - (i),

S.I. in 2 years = Rs. (3000 - 2900) = Rs. 100

$\therefore$ S.I. in 8 years = $\frac{100}{2} \times 8$
= Rs. 400

$\therefore$ From (i), P = 2900 - 400
= Rs. 2500

$\therefore$ Rate = $\frac{\text{S.I.} \times 100}{P \times T} = \frac{400 \times 100}{2500 \times 8} = 2\%$



101. A sum was invested on simple interest at a certain rate for 2 years. Had it been put at 3% higher rate, it would have fetched Rs. 72 more. The sum is:

- (a) Rs. 1,200 (b) Rs. 1,500
(c) Rs. 1,600 (d) Rs. 1,800

Sol. (a) According to the question,
(3 % × 2) of sum = Rs. 72

$$1\% = \frac{72}{6}$$

$$\therefore 100\% = \frac{72}{6} \times 100 = \text{Rs. } 1200$$

hence sum = 1200

102. A sum of money lent at simple interest amounts to Rs. 880 in 2 years and to Rs. 920 in 3 years. The sum of money (in rupees) is :

- (a) 700 (b) 760
(c) 784 (d) 800

Sol. (d) P + S.I. in 2 years = Rs. 880
.....(i)

P + S.I. in 3 years = Rs. 920

.....(ii)

By (ii) - (i), S.I. in 1 year = Rs. 40

$\therefore$ from (i), P = 880 - 80 = Rs. 800

103. A man invests half his capital at the rate of 10 % per annum, one-third at 9% and the rest at 12 % per annum. The average rate of interest per annum, which he gets, is :

- (a) 9 % (b) 10 %
(c) 10.5 % (d) 12 %

Sol. (d) Half = $\frac{1}{2}$, one - third = $\frac{1}{3}$

$\therefore$ Let the total sum = 100 × (L.C.M. of 2, 3) = Rs. 600

$$\therefore \text{Total interest} = \frac{1}{2} \times 600 \times 10\%$$

$$+ \frac{1}{3} \times 600 \times 9\% +$$

$$\left(600 - \frac{1}{2} \times 600 - \frac{1}{3} \times 600 \right) \times 12\%$$

$$= 300 \times 10\% + 200 \times 9\% + 100 \times 12\% \\ = 30 + 18 + 12 = \text{Rs. } 60$$

$\therefore$ Average rate per annum

$$= \frac{60}{600} \times 100 = 10\%$$

104. At some rate of simple interest, A lent Rs. 6,000 to B for 2 years and Rs. 1,500 to C for 4 years and received Rs. 9,00 as interest from both of them together. The rate of interest per annum was:

- (a) 5 % (b) 6 %
(c) 8 % (d) 10 %

Sol. (a) Let rate of interest per annum = 10 %

$$\therefore \text{Total interest received} = 6000 \times 10\% \times 2 + 10\% \times 4 \times 1500$$

$$= 6000 \times \frac{10}{100} \times 2 + \frac{10}{100} \times 4 \times 1500 \\ 1500 = 1200 + 600 = \text{Rs. } 1800 \\ \text{But, the given total interest} = \text{Rs. } 900$$

$$\text{i.e. } 1800 \longrightarrow 900$$

$$\therefore 10 \longrightarrow \frac{900}{1800} \times 10 = 5$$

i.e. Required rate = 5 %

105. The difference between the simple interest received from two different banks on Rs. 500 for 2 years is Rs. 2.50. The difference between their per annum rates of interest is :

- (a) 0.10 % (b) 0.25 %
(c) 0.50 % (d) 1.00 %

Sol. (b) Difference in S.I. (for 2 years) = Rs. 2.50

Principal = Rs. 500

$\therefore$ Required difference of rate

$$= \frac{1}{2} \times \left(\frac{2.5}{500} \times 100 \right) = 0.25\%$$

Alternatively

$$\frac{500 \times 2 \times R_1}{100} - \frac{500 \times 2 \times R_2}{100} = 2.5$$

$$\Rightarrow 10 (R_1 - R_2) = 2.5$$

$$\Rightarrow R_1 - R_2 = \frac{2.5}{10}$$

= 0.25 % per annum

106. A sum of money was lent at simple interest at certain rate for 3 years. Had it been lent at 2.5% per annum higher rate, it would have fetched Rs. 540 more. The money lent was :

- (a) Rs. 6400 (b) Rs. 6472
(c) Rs. 6840 (d) Rs. 7200

Sol. (d) According to the question,
(2.5 × 3) % of the sum = Rs. 540

$$\Rightarrow \text{sum} = \frac{540 \times 100}{7.5} = \text{Rs. } 7200$$

107. A sum of money was invested at a certain rate of simple interest for 2 years. Had it been invested at 1 % higher rate, it would have fetched Rs. 24 more interest. The sum of money is :

- (a) Rs. 1200 (b) Rs. 1050
(c) Rs. 1000 (d) Rs. 9600

Sol. (a) According to the question,
(1 × 2) % of the sum = Rs. 24

$$\Rightarrow \text{sum} = \frac{24 \times 100}{2} = \text{Rs. } 1200$$

108. Arun lends Rs. 20,000 to two of his friends. He gives Rs. 12,000 to the first at 8 % p.a. simple interest. Arun wants to make a profit of 10 % on the whole. The simple interest rate at which he should lend the remaining sum of money to the second friend is :

- (a) 8 % (b) 16 %
(c) 12 % (d) 13 %

Sol. (d) S.I. on Rs. 12000

$$= \frac{12000 \times 8 \times 1}{100} = \text{Rs. } 960$$

Desired gain on Rs. 20000

$$= 20000 \times \frac{10}{100} = \text{Rs. } 2000$$

$\therefore$ S.I. on Rs. 8000
= 2000 - 960 = Rs. 1040

$$\therefore \text{Rate} = \frac{\text{S.I.} \times 100}{\text{Principal} \times \text{Time}}$$

$$= \frac{1040 \times 100}{8000} = 13\% \text{ per annum}$$



109. A person invests Rs. 12,000 as fixed deposit at a bank at the rate of 10 % per annum simple interest. But due to some pressing needs he has to withdraw the entire money after 3 years, for which the bank allowed him a lower rate of interest. If he gets Rs.3,320 less than what he would have got at the end of 5 years, the rate of interest allowed by the bank is :

- (a) $7\frac{5}{9}\%$ (b) $7\frac{4}{9}\%$
(c) $7\frac{8}{9}\%$ (d) $8\frac{7}{9}\%$

Sol. (b) S.I. after 5 years = $\frac{PRT}{100}$

$$= \frac{12000 \times 10 \times 5}{100} = \text{Rs. } 6000$$

Interest earned = Rs.
(6000 - 3320) = Rs. 2680

$$\therefore \text{Rate} = \frac{\text{S.I.} \times 100}{PT}$$

$$= \frac{2680 \times 100}{12000 \times 3} = \frac{67}{9} = 7\frac{4}{9}\%$$

110. A certain scheme of investment in simple interest declares that it triples the investment in 8 years. If you want to quadruple your money through that scheme, you have to invest it for :

- (a) 11 years 6 months
(b) 10 years 8 months
(c) 10 years (d) 12 years

Sol. (d) Let principal = P

$$\begin{array}{lll} P & A & \text{SI} \\ P & 3P & = 2P \\ P & 4P & = 3P \end{array}$$

Now,

2P SI in 8 years

$$\therefore 1P \text{ SI in } = \frac{8}{2}$$

$$\therefore 3P \text{ SI} = \frac{8}{2} \times 3 = 12 \text{ years}$$

111. A person who pays income tax at the rate of 4 paise per rupee, find that a fall of interest rate from 4 % to 3.75% diminishes his net yearly income by Rs. 48. What is his capital ?

- (a) Rs. 24,000 (b) Rs. 25,000
(c) Rs. 20,000 (d) 18,000

Sol. (c) Let the capital = x
 $r = 4 - 3.75\% = 0.25\%$

$$\text{Income tax} = \frac{4}{100} \times 100 = 4\%$$

Remaining amount after

$$\text{Giving tax} = \frac{96}{100}x$$

$$\text{SI} = \frac{prt}{100}$$

$$48 = \frac{96x}{100} \times 0.25 \times 1$$

$$x = \text{Rs. } 20,000$$

112. If a man receives on one-fourth of his capital 3 % interest, on two third 5 % and on the remainder 11 %, the percentage he receives on the whole is :

- (a) 4.5 (b) 5
(c) 5.5 (d) 5.2

Sol. (b) Let the capital = $100 \times \text{LCM of } 4, 3 = 1200$

according to the question,

$$3\% \text{ of } \left(\frac{1}{4} \times 1200\right) + 5\%$$

$$\text{of } \left(\frac{2}{3} \times 1200\right) + 11\%$$

$$\text{of } \left(1200 \times \left(1 - \frac{1}{4} + \frac{2}{3}\right)\right)$$

$$= \frac{3}{100} \times 300 + \frac{5}{100} \times 800 + \frac{11}{100} \times 100 = 9 + 40 + 11 = 60$$

$$\text{Required \%} = \frac{60}{1200} \times 100 = 5\%$$

113. A sum becomes 450 in certain years at rate of 7% and it becomes 350 in same time if the rate is 5%. Find the principle and the time:

- (a) 50 years, Rs.100
(b) 40 years, Rs.100
(c) 55 years, Rs.200
(d) 58 years, Rs.200

Sol. (a) Amount is Rs. 450 at 7%
amount is Rs. 350 at 5%
Then, S.I. at 2% in same time on same principal will be Rs. 100
from 5% it will be Rs. 250
then the principal = $350 - 250 = \text{Rs. } 100$

$$\text{So, } \frac{100 \times 5 \times t}{100} = 250$$

$$t = 50 \text{ yrs.}$$

114. A man invests some money continuously for 3 years at the rate of 11 % per annum. After 3 years man got Rs. 30012 from the bank. Then find what money he invested every year:

- (a) 9000, 4 yrs.
(b) 7500, 4 yrs.
(c) 8200, 3 yrs.
(d) 8000, 3 yrs.

Sol. (c) Let P = 100

$$100 \xrightarrow{\text{S.I. of 1 year}} 11\%$$

$$100 + 100 \xrightarrow{\text{S.I. of 1 year}} 22\%$$

$$100 + 100 + 100 \xrightarrow{\text{S.I. of 1 year}} 33\%$$

At the end of 3 years principal = 300

At the end 3 years SI = 66

So amount will be = $300 + 66 = \text{Rs. } 366$

when amount is 366 then he invests 100 per year
but the amount is 30012 so, he must have invested

$$= \frac{100}{366} \times 30012 = \text{Rs. } 8200$$

115. Two equal sums of money are lent at the same time at 8% and 7 % per annum on 6 months more than the later and the amount in each case is Rs. 2560. The sum and the time for which the sums of money lent out are :

- (a) 2000 (b) 2500
(c) 4000 (d) 1700

$$\text{Sol. (a) } P + \frac{P \times r_1 \times t_1}{100} = P + \frac{P \times r_2 \times t_2}{100}$$

$$8 \times \left(t - \frac{1}{2}\right) = 7 \times t$$



$$8t - 4 = 7t$$

$$t = 4 \text{ years}$$

$$\text{Let } P = 100$$

$$SI = \frac{100 \times 4 \times 7}{100} = 28$$

for amount 128. Principal is 100

∴ ∴ 2560 ∴ ∴ will be

$$\frac{100}{128} \times 2560$$

$$= \text{Principal} = \text{Rs.}2000$$

116. A father wants to divide 18750 between his two sons. One is 12 years old and other is 14 years old. Father wants that at the rate of 5% his both sons will get the same amount at the age of 18. Find the sum that should be allotted to elder son:

- (a) 9000 (b) 9750
(c) 9500 (d) 10000

Sol. (b) SI of A = $5 \times 6 = 30\%$
SI of B = $5 \times 4 = 20\%$

$$130 A = 120 B$$

$$A : B \\ 12 : 13$$

$$25 R = 18750$$

$$1 R = 750$$

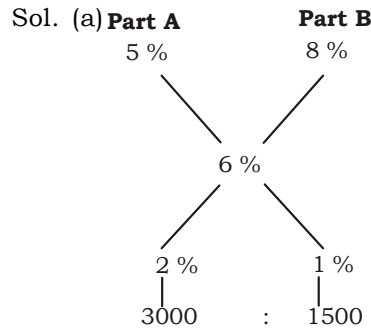
$$A = 750 \times 12 = \text{Rs.}9000$$

$$B = 750 \times 13 = \text{Rs.}9750$$

117. A man invests Rs.3000 at the rate of 5%. How much more should he invest at the rate of

8% so, that he can earn at total profit of 6% :

- (a) 1400 (b) 1200
(c) 1600 (d) 1500



So he should invest Rs.1500 at 8%

118. Two equal sums of money are lent out, one at 4% and other

at $4\frac{1}{2}\%$ at the end of 7 years

the simple interest received from the latter exceeded that received from the former by Rs. 31.50. total sum was (in Rs.)

- (a) 850 (b) 900
(c) 980 (d) 1000

Sol. (b) Difference in rate = $4\frac{1}{2}\%$
- 4% = 0.5%
SI in 7 years = $0.5\% \times 7 = 3.5\%$
 $3.5\% = 31.50$

$$\therefore 1\% = \frac{31.5}{3.5}$$

$$\therefore 100\% = \frac{31.5}{3.5} \times 100 = \text{Rs.}900$$

119. A sum of Rs.1440 is lent out in three parts in such a way that the interest on first part at 2% for 3 years on second part at 3% for 4 years, and third part at 4% for 5 years are equal. Then the

difference of the largest part and the smallest part is :

- (a) 560 (b) 580
(c) 460 (d) 660

Sol. (a) SI of A $2 \times 3 = 6$
SI of B $3 \times 4 = 12$
SI of C $4 \times 5 = 20$

$$6A = 12B = 20C$$

$$A : B : C \\ 10 : 5 : 3$$

$$\text{Difference} = \frac{1440}{18} \times 7 = \text{Rs.}560$$

120. A certain sum gives certain S.I. in certain time at a certain rate r %. If we increase the sum by

20 % and rate becomes $\frac{2}{3}$ but

time becomes $\frac{6}{5}$. Then the SI

is Rs.2400, find what was the SI before :

- (a) 2550 (b) 3500
(c) 2500 (d) 2600

Sol. (c) Let sum = P
rate = r
time = t

$$SI = \frac{P \times r \times t}{100}$$

$$\text{Now, SI} = \frac{\frac{6P}{5} \times \frac{2}{3} r \times \frac{6}{5} t}{100} = 2400$$

$$= \frac{P \times r \times t}{100} = 2500$$

$$\frac{P \times r \times t}{100} = SI$$

then SI = Rs.2500



Exercise

1. ₹ 3600 was lent out on simple interest at $6\frac{1}{4}\%$ per annum. What will be the amount after $2\frac{1}{3}$ years?
 - (a) ₹ 525 (b) ₹ 4,025
 - (c) ₹ 4,125 (d) ₹ 4,000
2. Praveen deposited ₹ 5,000 in a post office on 5th January 1999. And he withdraw the total amount on 31st May of the same year. How much interest will he receive at 5% rate of simple interest?
 - (a) ₹ 125 (b) ₹ 100
 - (c) ₹ 112.5 (d) None of these
3. Rakesh Yadav took ₹ 7500 loan at a certain rate of simple interest per annum and ₹ 4500 at 1% more. After three years he paid ₹1575 as simple interest. Find at what rate did he take ₹ 4500 loan?
 - (a) $6\frac{1}{4}\%$ (b) $6\frac{2}{3}\%$
 - (c) 5% (d) 6%
4. Bhuvnesh lent out ₹ 10800. A part of the amount was lent at 8% per annum and rest at 10% rate of simple interest per annum. If after two years he has gained ₹ 1908 as interest, find the sum of money on two different Rates he lent out.
 - (a) ₹ 6300, 4500
 - (b) ₹ 4500, 6300
 - (c) ₹ 4000, 6800
 - (d) ₹ 6800, 4000
5. ₹ 12000 was divided into two parts and first was lent out at 8% per annum rate of simple interest for 5 years and the other part was lent out at 10% per annum rate of simple interest for 4 years. If the interest on first part is thrice that of the second part, find the difference between two parts-
 - (a) ₹ 5,000 (b) ₹ 4,800
 - (c) ₹ 6,000 (d) ₹ 4,200
6. Rohit deposited 12,600 in a bank at 8% per annum and ₹ 4,200 at 6% per annum in another bank. After one year at what effective rate did he get his return on the whole amount he invested?
 - (a) 7% (b) 8.25%
 - (c) 7.5% (d) 7.75%
7. A certain amount becomes ₹ 1200 in 6 years and ₹1350 in 9 years at certain rate of simple interest. Find the rate of simple interest-
 - (a) $5\frac{1}{2}\%$ (b) $5\frac{5}{9}\%$
 - (c) $6\frac{1}{4}\%$ (d) None of these
8. A certain amount becomes ₹ 30,000 in 8 years. If the simple interest is half of the principal amount, find the rate of interest and the amount.
 - (a) $6\frac{1}{4}\%$, 24,000
 - (b) 6% , 20,000
 - (c) $6\frac{1}{4}\%$, 20,000
 - (d) $6\frac{2}{3}\%$, 20,000
9. A certain amount becomes ₹ 11600 at $7\frac{1}{2}\%$ per annum in 6 years. How much would be the amount if it was lent out at 10% for 6 years?
 - (a) ₹ 12,000 (b) ₹ 14,400
 - (c) ₹ 13960 (d) ₹ 12,800
10. Pawan has ₹ 8000. He lent out ₹ 2,000 at 5% per annum ₹ 2,500 at 10% per annum and the remaining at r% per annum. He found that he got a return of 8% on the whole amount. Find the value of r.
 - (a) $8\frac{1}{3}\%$ (b) $8\frac{2}{7}\%$
 - (c) $8\frac{2}{5}\%$ (d) None of these
11. Rakesh Yadav lent out his $\frac{1}{3}$ amount at 7% per annum $\frac{2}{5}$ amount at 10% per annum and the rest at 12% per annum. If after two year his income is ₹1430 find the amount he lent out :
 - (a) 8,000 (b) 7500
 - (c) 7200 (d) None of these
12. ₹19400 is divided into two parts. First part is lent out at 8% per annum for 5 years and the other part is lent out at 4% per annum for 9 years. If the ratio of simple interest recieved on two parts is 3 : 7. Find the amount of second part :
 - (a) ₹ 5,400 (b) ₹14000
 - (c) ₹ 9700 (d) None of these
13. An amount of ₹18600 is divided into three parts and these parts are lent out for 2 years, 4 years and 5 years respectively. If the rate of simple interest is 10% p.a., then the amount of all 3 parts become same. Find the three parts :
 - (a) ₹ 5, 600, ₹ 6,000, ₹ 7,000
 - (b) ₹ 4500, ₹ 6400, ₹ 7700
 - (c) ₹ 7,000, ₹ 6,000, ₹ 5600
 - (d) ₹ 7700, ₹ 6400, ₹ 4500
14. Three sums x, y and z are such that y is simple interest of x and z is the simple interest of y. If



in both the conditions time and rate of interest are same then find a relation between x , y and z .

- (a) $z^2 = xy$ (b) $x^2 = yz$
 (c) $y^2 = xz$
 (d) None of these
15. Shiv lent out a certain sum at 5% per annum and 6 months later he lent out the same sum at 6% per annum. After a certain time shiv got Rs. 4600 total amount from each. How much money did he lend each time?
 (a) ₹ 4200 (b) ₹ 4000
 (c) ₹ 3600 (d) ₹ 3800
16. A man bought a bike and paid Rs.15,000 instantly. He promised that he would pay the rest money in two years 13920 with interest and the rate of interest being 8%. Find the cost of the bike.
 (a) 30,000 (b) 25,000
 (c) 28920 (d) 27,000
17. Bhuvnesh lent out a certain amount at 6% per annum for 2 years and another at 7% per annum for the same time and after the completion of the period. He got ₹ 2478 as interest. If one-fourth of the first amount is equal to one-fifth of the second amount. Find the total amount he lent out—
 (a) ₹ 19900 (b) ₹ 19100
 (c) ₹ 18900 (d) ₹ 18100
18. Rohit lent out a certain amount for some years. He lent it at 7% per annum for the first 3 years, at 9% for the next 4 years and for the rest time at 4% per annum. If at the end of 12 years he got ₹ 2772 as simple interest on the amount, find the amount he lent out.
 (a) ₹ 3,000 (b) ₹ 4,000
 (c) ₹ 3500 (d) ₹ 3600

19. Bhuvnesh took a loan of ₹ 7000 at simple interest. And further took a loan of ₹ 3000 after 3 years. After 5 years of second loan he paid Rs.4615 as interest and closed his account. Find the rate of interest.

- (a) 5.5% (b) 6.5%
 (c) 7.5% (d) 7.15%
20. A certain amount was taken as loan at 6% per annum loan. In the first year Rs.6800 was paid back and the rest money was charged with 5% p.a. . If the interest for second year is $\frac{11}{20}$ of the interest of 1st year, then find the amount taken on loan.
 (a) ₹ 20,000 (b) ₹ 17,000
 (c) ₹17500 (d) ₹16000
21. A certain amount at certain rate of simple interest for certain time gives a certain interest. The amount is increased by 20%, rate is made $\frac{2}{3}$ of the previous and time is made $\frac{6}{5}$ of the previous. In this way the simple interest received is ₹ 2400. What was the interest received in the first condition?
 (a) ₹ 3,000 (d) ₹ 24,00
 (c) ₹ 2500
 (d) None of these
22. ₹ 30,000 is paid back in three annual installments. If the interest on the rest of the money at 4% added to each installment, find all three installments.
 (a) 11200
 (b) 11200, 10400, 10200
 (c) 11200, 10800, 10400
 (d) None of these
23. A certain amount becomes 4 times at 8% per annum. At what rate it will become 10 times in the same time?
 (a) 25% (b) 27.5%
 (c) 24% (d) 30%
24. The interest of what amount at 5% per annum for $3\frac{1}{2}$ years

will be equal to the interest of Rs.1400 at $2\frac{1}{2}\%$ per annum for 4 years?

- (a) ₹ 100 (b) ₹ 960
 (c) ₹ 740 (d) ₹ 800
25. A certain amount becomes $\frac{29}{25}$ times at simple interest. If the numerical value of interest rate and time be the same, find the rate of interest.
 (a) 4% (b) 5%
 (c) 5.5% (d) 4.5%
26. A certain amount becomes Rs.3000 in 5 years. If the simple interest received is one-fourth of the amount find the rate of interest and the amount.
 (a) 5%, ₹ 2500
 (b) 6%, ₹ 2400
 (c) 5%, ₹ 2600
 (d) None of these
27. A certain amount becomes ₹ 3000 at 4% per annum in $6\frac{1}{4}$ years. What will be amount at $6\frac{2}{3}\%$ per annum in $5\frac{1}{2}$ years?
 (a) ₹ 3600 (b) ₹ 3050
 (c) ₹ 3080 (d) ₹ 3280
28. Bhuvnesh deposited ₹ 8000 in a bank and ₹ 4500 in the next year. If after 5 years he received ₹ 3480 as simple interest, find the rate of interest.
 (a) 7.5% (b) $6\frac{1}{4}\%$
 (c) 6% (d) $5\frac{1}{2}\%$
29. Jitu has ₹ 20,000 out of which he lends ₹ 4000 at 7% per annum, ₹ 6000 at 8% per annum, 5000 at 10% per annum and the remaining at $r\%$. If after calculation he get to know that he had gained 12% income on the whole amount, find the value of r .
 (a) 20% (b) 25%
 (c) 22.8% (d) 24%



30. Rakesh Yadav had ₹ 25000 out of which he lent out some amount at 8% and remaining at 11%. After four year he got Rs.9080 as interest. Find the amount lent out at each rate—
 (a) 9000 at 8%, 16000 at 11%
 (b) 12500 at 8%, 12500 at 11%
 (c) 15000 at 18%, 1000 at 11%
 (d) 16000 at 8%, 9000 at 11%
31. Bhuvnesh took a loan of Rs. 10,000 from his friend at 12% per annum rate of simple interest for 5 years. He gave his friend a watch and a camera as interest. The cost of these two articles is in the ratio of 7 : 23. Find the cost of the camera
 (a) ₹ 6900 (b) ₹ 3450
 (c) ₹ 4600 (d) ₹ 4400
32. Radha lent out some money at 8.37%. Per annum rate of simple interest for $2\frac{1}{2}$ years. She calculated that had she given it at 1.37% less, she would have received ₹ 6850 less. What amount he lent out?
 (a) 1,00,000 (b) 2,40,000
 (c) 2,00,000 (d) 1,40,000
33. Rakesh Yadav and Bhuvnesh invested ₹ 5400 and ₹ 7200 for 4 years and 3 years respectively. If the total simple interest received by both of them is ₹ 3456 and the rate charged by them is in the ratio of 3 : 5, At what rate Bhuvnesh invested the money.
 (a) 6% (b) 7.5%
 (c) 10% (d) 12.5%
34. Rakesh Yadav and Kareena lent out ₹ 14400 and ₹ 16200 for $3\frac{3}{8}$ years and 3 years respectively at simple interest. After the completion of time. Kareena received ₹1458 more than that of Rakesh. Find the difference of rates at which both lent out the money.
 (a) 3% (b) 5%
 (c) 2.5%
 (d) Can't be determined
35. Manoj lent out ₹ 5650 for $3\frac{1}{2}$ years at simple interest and after the completion of time he received an amount of ₹ 6441. If he increases the rate of interest he will get ₹ 8418.50. Find how much he increases the rate of interest ?
 (c) 8% (b) 14%
 (c) 9% (d) 10%
36. X lent out a part of ₹ 22000 to Y and the rest to Z. The ratio of rates at which he lent to X and Y was 4 : 5 and the ratio of time was $2\frac{1}{2} : 3\frac{1}{2}$. If both paid the same interest, find the amount taken on loan by each of them.
 (a) 8,000, 14,000
 (b) 14000, 8000
 (c) 10,000, 12,000
 (d) 12,000, 10,000
37. Parveen divided ₹ 44000 in two parts and lent out to two persons at 7% and 10% for 4 years and 2 years respectively. The interest received by them was in the ratio 4 : 5 How many rupees did parveen lend to first person?
 (a) 16000 (b) 22000
 (c) 28000
 (d) None of these
38. ₹ 2250 was divided into two parts and first was lent out at $4\frac{1}{2}$ % per annum for 3 years while the other at 6% per annum for $1\frac{4}{5}$ years. It same interest is received in both the investments. Find the difference between two parts lent out.
 (a) 200 (b) 450
 (c) 350 (d) 250
39. I lent out a certain amount at certain rate of simple interest for certain time and I got ₹ 1250 as interest. If I lent out 40% more amount for $\frac{4}{7}$ time at $\frac{3}{2}$ rate of interest, what would be my interest received?
 (a) 2000 (b) 1000
 (c) 1750 (d) 1500
40. ₹ 44900 is divided among four people. If they pay equal amount (principal amount + interest) after 2 years, 4 years, 6 years and 10 years at 10% per annum rate of simple interest. Find the difference of the maximum and the minimum share they received.
 (a) ₹ 17665.57 (b) ₹ 21600
 (c) ₹ 5600 (d) ₹ 8600
41. Bhuvnesh took a loan of ₹ 50,000 at $6\frac{1}{2}$ % per annum for three years. And he also lent out ₹ 60,000 at 7% for $3\frac{1}{2}$ years. In this way whatever he earned he invested it on purchasing a Fan, a table and a calculator the costs of which were in ratio 28 : 15 : 7. Find the cost of the fan, the table, and the calculator each.
 (a) ₹ 2800, ₹ 1500, ₹ 700
 (b) ₹ 2872, ₹ 1515, ₹ 707
 (c) ₹ 2727, ₹ 1439, ₹ 639
 (d) ₹ 2772, ₹ 1485, ₹ 693
42. ₹ 33220 was divided among three friends. If after 4 years 5 years and 10 years respectively they paid same interest amount, interest rate being 7% per annum, Find the share of each of them.
 (a) 6040, 12080, 15100
 (b) 15100, 12088, 6040
 (c) 15100, 12080, 6004
 (d) None of these



43. A lent out 4800 to B at 8% per annum rate of simple interest for 2 years. B lent the same amount to C at 3% more for the same time period. If after the completion of time B paid back to A and C paid back to B, Find the profit of B.
 (a) ₹ 144 (b) ₹ 288
 (c) ₹ 320 (d) ₹ 324
44. Two same amounts were borrowed for the same time at 9% per annum and 8% per annum rate of simple interest respectively. The first amount was taken back 6 months earlier than second and in this way the total amount paid in both the conditions was ₹ 17680. Find each amount and also find the time of their borrowing ?
 (a) ₹ 14000, 5 year $5\frac{1}{2}$ year
 (b) ₹ 13000, $4\frac{1}{2}$ years, 5 year
 (c) ₹ 13000, 4 years, $4\frac{1}{2}$ year
 (d) None of these
45. Rohit bought an old car at the down payment of ₹ 30,000. He promised that he would pay the rest amount after three years at 8% interest rate by paying ₹ 49600. At what cost did he buy the car.
 (a) 60,000 (b) 70,000
 (c) 72,000 (d) 68,000
46. A certain amount was lent out at 8% per annum rate of simple interest and after one year ₹ 4680 was paid back and the interest rate on the remaining sum was made 7% per annum. If the interest of second year is $\frac{3}{4}$ of the first year's interest, find the amount lent out.
 (a) 20,000 (b) 18,500
 (c) 19,100 (d) 21,000
47. The time taken by ₹ 1500 to become ₹ 1680 at 4% per annum is same as the time taken by a certain amount to become ₹ 1150 at 5% per annum. Find the certain amount
 (a) ₹ 900 (b) ₹ 980
 (c) ₹ 1000 (d) ₹ 1020
48. X, Y and Z are three friends. X took loan from Y and Z of ₹ 1200 and 1600 at 5% per annum and at 4% per annum respectively for 3 years. After the completion of the time X returned the amount with interest to Y and Z. Being a friend Y and Z returned 1% of the interest they received from X. Find the actual interest X paid to Y and Z.
 (a) ₹ 372 (b) ₹ 367.82
 (c) ₹ 368.28 (d) ₹ 363.36
49. Rakesh Yadav lent out 12000 in two parts one at $7\frac{1}{2}\%$ and the other at $9\frac{1}{2}\%$ per annum. After three years each received ₹ 1000 as interest. Find the difference between two parts.
 (a) ₹ 0 (b) ₹ 1000
 (c) ₹ 2000 (d) ₹ 1500
50. A man had ₹ 30,000. He invested ₹ 10,000 at 6% per annum in a post-office and ₹ 8,000 at 4% per annum in a bank. If he wants to earn ₹ 1880 as interest at what rate the rest amount should be lent out ?
 (a) 10% (b) 8.5%
 (c) 7.5% (d) 8%
51. A person lent out $\frac{2}{5}$ of the total amount at 15%, $\frac{3}{7}$ of the total amount at 10% and the remaining at 26% If at the end of the year he received ₹ 10320 as interest, Find the amount he lent out at 15% ?
 (a) 42,000
 (b) 28,000
 (c) 30,000
 (d) None of these
52. The interest received on a certain amount at certain interest rate is ₹ x. If the amount is made $\frac{3}{2}$ times, rate is made $\frac{4}{5}$ times and the time is made $\frac{7}{6}$ times, the interest received becomes y. Find what percentage of x is y ?
 (a) $71\frac{3}{7}\%$ (b) 40%
 (c) 60% (d) 140%
53. The simple interest received at 6% per annum after 22 years is ₹ 2560 more than the principal amount after the completion of the time how much money would be repaid?
 (a) 10560 (b) 18560
 (c) 8000
 (d) None of these
54. ₹ 35480 was divided into three parts and were lent out for 2 years, 4 years and 5 years respectively. If the rate of interest is 15%, 5% and 3% respectively Find the three parts. If the total amount repaid is equal in all three conditions.
 (a) 11960, 11040, 12480
 (c) 11660, 11340, 12480
 (c) 11340, 11660, 12480
 (d) 11040, 11960, 12480
55. A person deposits a certain amount in the bank in the beginning of the year at 11% per annum rate of simple interest. If after three years he received ₹ 30012, Find how much amount does he deposit each year?
 (a) ₹ 9600 (b) ₹ 8000
 (c) ₹ 8200 (d) ₹ 8600
56. a, b, c and d are such that a is the interest of b, b is the interest of c and c is the interest of d. If in all three conditions the rate of interest and time be the same which term will show the ratio of a to d ?



- (a) $b : c$ (b) $b^2 : c^2$
(c) $b^3 : c^3$ (d) None of these
57. A certain amount becomes $\frac{41}{40}$ of itself in $\frac{1}{4}$ year. Find the rate of simple interest ?
(a) 10% (b) 1%
(c) 2.5% (d) 5%
58. A man lent out ₹ 5000 in two parts, first at 4% per annum and second at 5% after two years he received ₹ 440 as simple interest. In what ratio the two parts were divided ?
(a) 4 : 5 (b) 3 : 2
(c) 5 : 4 (d) 2 : 3
59. The simple interest on a certain amount is $\frac{4}{9}$ of the principal amount. If the numerical value of rate of interest and the time are equal, Find the rate of interest?
(a) 5% (b) $6\frac{2}{3}\%$
(c) 6% (d) $7\frac{1}{5}\%$
60. Due to the decrease in the interest rate from 11.5% to 10% the income of a man decreases by 55.50. Find the amount.
(a) 3700 (b) 7400
(c) 8325 (d) 11100
61. A lent out ₹ 2500 to B and some money to C at 7% per annum rate of simple interest. If after 4 years A received a total of ₹ 1120 from B and C, Find the amount lent out to C.
(c) 7000 (b) 6500
(c) 4000 (d) 1500
62. The difference of simple interest on ₹1500 from two different sources for three years is ₹13.50, Find the difference of the interest rates.
(a) 0.1% (b) 0.2%
(c) 0.3% (d) 0.4%
63. Rakesh Yadav lent out a certain sum at 9% per annum rate of simple interest and the same sum lent out at 10% per annum rate of simple interest for 2 years. In all he got ₹ 760 as interest sum. Find each sum.
(a) ₹ 1700 (b) ₹ 1800
(c) ₹ 1900 (d) ₹ 2000
64. ₹ 10,000 is lent out in two parts one at 8% and other at 10%. If the average annual interest rate is 9.2% then find the two parts
(a) ₹ 4000, ₹ 6,000
(b) ₹ 4500, ₹ 5500
(c) ₹ 5000, ₹ 5000
(d) ₹ 5500, ₹ 4500
65. ₹ 500 is invested at 12% per annum rate of simple interest and another amount at 10% per annum rate of simple interest. If after 4 years the interest received on both the amounts is ₹ 480. Find the other amount.
(a) 450 (b) 750
(c) 600 (d) 550
66. An amount of ₹1500 is lent out in two parts such that the simple interest at first is 10% per annum for five years is equal to the simple interest at another at 12.5% for four years. Find the amount lent out at 12.5%
(a) ₹ 500 (b) ₹ 1000
(c) ₹ 750 (d) ₹ 1250
67. Bhuvnesh borrowed a certain amount from Rakesh Yadav at 12% per annum for the first three years at 16% per annum for next 5 years and at 20% per annum for the period beyond 8 years. If after 11 years the interest became ₹ 6080 more than the principal amount. Find the amount taken by Bhuvnesh
(a) ₹ 8,000 (b) ₹ 12,000
(c) ₹ 6,000 (d) ₹ 10,000
68. If ₹ 12000 is divided into two parts such that simple interest on first part at 12% per annum for 3 years is equal to the simple interest on second part at 16% per annum for $4\frac{1}{2}$ years. Find the greater part.
(a) ₹ 8,000 (b) ₹ 6,000
(c) ₹ 7,000 (d) ₹ 7,500
69. A man has ₹ 10,000 for the investment. He invests ₹ 4000 at simple interest rate of 5% per annum and ₹ 3500 at 4% per annum. At what rate should he invest the rest amount so that his annual income may become ₹ 500.
(a) 6% (b) 6%
(c) 6.4% (d) 6.3%
70. A certain amount becomes 3 times in 4 years on simple interest. In what time it will become 7 times ?
(a) 8 years (b) 12 years
(c) 15 years
(d) None of these
71. A certain amount is lent out for a certain time. The rate of simple interest for the first 3 years is 5% for the next 4 years it is 6% and for the rest of the 2 years the rate is 3%. If after 9 years the total amount of simple interest is ₹ 1350, then find the amount lent out.
(a) ₹ 4500 (b) ₹ 2870
(c) ₹ 3000 (d) ₹ 2250
72. A certain amount becomes ₹ 2800 in 3 years and ₹3000 in 5 years. Find the amount and rate of simple interest.
(a) 2000, 5% (b) 2400, 5%
(c) 2500, 4% (d) 2500, 3%
73. A man lent out ₹ 8400 in two parts first at 11% per annum and second at 15% per annum. If the simple interest received after two years is ₹ 2232. Find each part.
(a) 4000, 4400
(b) 3600, 4800
(c) 3200, 5200
(d) 3500, 4900
74. A certain amount is lent out for three years at simple interest. If the rate of interest is 4% less there will be a loss of ₹ 720. Find the amount.
(a) 7200 (b) 8000
(c) 6000 (d) 6200



75. ₹ 21140 was divided into two parts and the first was lent out at 8% per annum for three years while the other part was lent out at 9% per annum for two years. If in both the conditions, simple interest is same find the value of each part.
(a) 9006, 12134
(b) 9060, 12008
(c) 9060, 12800
(d) 9060, 12080
76. ₹ 18600 was divided among three parts and each part was lent out at 10% per annum rate of simple interest for 2 years, 4 years and 5 years respectively. If the total amount (interest + principal) is same in all the three conditions, Find each part.
(a) 5600, 6000, 7000
(b) 6000, 7000, 5600
(c) 7000, 6000, 5600
(d) 5600, 7000, 6000
77. A man deposits a certain amount in a bank in the beginning of each year for three years. If after completion of three years, the amount deposited in his account is ₹ 23808 and the rate of simple interest is 12%, find how much money does he deposit each year?
(a) ₹ 5600 (b) ₹ 6000
(c) ₹ 6200 (d) ₹ 6400
78. ₹ 1500 was divided into two parts first was lent out at 6% for 4 years while second was lent out at 5% per annum for 3 years. If the simple interest received in two conditions are in the ratio 16 : 15, Find the amount of first part.
(a) ₹ 500 (b) ₹ 600
(c) ₹ 900 (d) ₹ 1000
79. An article is bought for ₹ 6000 at down payment and rest of the amount was paid back

after $2\frac{1}{2}$ years with 6% per annum rate of simple interest by paying ₹12650. Find the cost of the article.

- (a) 10000 (b) 16000
(c) 17000 (d) None of these
80. Praveen lent out $\frac{2}{5}$ of his total amount at 4%, $\frac{1}{3}$ at 5% and the remaining at 10% per annum. If he gets ₹ 267 simple interest per annum, find his total amount.
(a) 4000 (b) 4500
(c) 4800 (d) 5000
81. When the rate of simple interest decreases from 5% to 4% and the investment is increased by ₹4000 in this way the earnings in two conditions remains same. Find the initial amount of investment.
(a) 12,000 (b) 16,000
(c) 20,000 (d) 24,000
82. Rakesh Yadav invested 40% of his total amount at 15% per annum, 50% of the rest amount at 10% per annum and the remaining amount at 18%. If the interest is calculated on the whole amount what will be effective single annual rate of interest?
(a) 14% (b) 14.33%
(c) 14.4% (d) 15.2%
83. Bhuvnesh took a loan of ₹ 12000 from a bank at simple interest. After three years he deposited ₹ 6500. From the principal amount after 2 years of this he deposited ₹ 9260 in the bank and closed his account. Find the rate of interest.
(a) 6% (b) 10%
(c) 8% (d) 9%
84. Praveen marked two different prices of an article One for cash payers and the other for taking it on loan for 6 months. What

will be the ratio of two prices If the rate of simple interest is

$6\frac{1}{4}\%$ per annum.

- (a) 5 : 6 (b) 19 : 18
(c) 32 : 33 (d) 44 : 45
85. A man lent out ₹ 500 to P at a certain rate and ₹ 2000 to Q at 2% more than that of P. After three year he got ₹ 345 as simple interest from P and Q together. At what rate did he lend to Q ?
(a) 3% (b) 6%
(c) 4% (d) 5%
86. The simple interest on a certain sum at 5% per annum for 6 years is ₹248 more than the interest on the same amount at 4% per annum for 7 years. What will be the simple interest on the same amount at 3% per annum for 3 years?
(a) ₹ 960 (b) ₹ 1024
(c) ₹ 1116 (d) ₹ 1260
87. The simple interest on a certain amount for 12 years is ₹ 1500 If after each 4 years the principal is increased by 10% and 25% respectively, then find what will be the simple interest received on it after 12 years?
(a) ₹ 1675 (b) ₹ 1800
(c) ₹ 1680 (d) ₹ 1920
88. Abhinav has a total ₹ 2600 out of which he deposits in bank A and the remaining in bank B. The rate of simple interest given by banks A and B are $5\frac{1}{2}\%$ and $7\frac{1}{2}\%$ respectively If he has got equal interest from both the banks after a certain time, Find how much he deposited in bank B ?
(a) 1500 (b) 1200
(c) 1400 (d) 1100
89. Simple interest on a certain sum for certain time at certain rate is ₹480. If the principal amount is increased



- by 20%, time becomes two third of the previous and the rate of interest is changed to $\frac{5}{3}$ times, find the interest received now?
- (a) 360 (b) 640
(c) 720 (d) 600
90. A certain amount becomes five times at 6% per annum in a certain time period at simple interest. How many times it will be in the same time if the rate of interest becomes 9%?
- (a) 7 (b) 6
(c) 10 (d) 8
91. ₹ 1900 was divided into two parts and first part was lent out as 8% per annum for 2 years and the second at 4% per annum for 3 years. If the simple interest received in both the conditions is in the ratio 16 : 7, then find the amount lent out at 4% ?
- (a) ₹ 900 (b) ₹ 1000
(c) ₹ 1200 (d) ₹ 700
92. A scooter is bought for ₹ 9000 at down payment and the remaining amount is paid after three years by paying ₹ 23375 including simple interest of rate of $12\frac{1}{2}\%$ per annum find the total cost of the scooter.
- (a) 27000 (b) 26000
(c) 24480 (d) 23000
93. The simple interest on a certain sum at 4% per annum for 30 years is ₹ 120 more than the principal amount. Find the amount?
- (a) 600 (b) 500
(c) 700 (d) 480
94. A sum of money becomes Rs.1344 in 3 years and in 7 years it becomes Rs. 1536. What is the principal sum where simple rate of interest is to be charged?
- (a) 4000 (b) 1500
(c) 1200 (d) 2800
95. A certain sum of money amounts to Rs. 15900 at simple rate of interest at 6% p.a. in 1 year. What is the value of principal sum?
- (a) 12000 (b) 18000
(c) 15000 (d) 14000
96. A sum of money becomes 3 times in 12 years. In how many years it will become 5 times at the same rate of simple interest?
- (a) 20 years (b) 16 years
(c) 24 years (d) 30 years
97. What is the sum which gives Rs. 6300 as interest at the rate 7% per annum of simple interest in $7\frac{1}{2}$ years?
- (a) 36000 (b) 24000
(c) 63000 (d) 12000
98. A sum was put at simple interest at a certain rate for 2 years. Had it been put at 4% higher rate, it would have fetched Rs.112 more. The sum is:
- (a) 1120 (b) 1400
(c) 1200 (d) 8000
99. In what time will a sum of money doubles itself at the rate 20% per annum (p.a.) simple interest?
- (a) 10 years (b) 5 years
(c) 2 years (d) 4 years
100. A sum of money triples (i.e., 3 times) in 15 years. The rate of interest per annum is :
- (a) 12% (b) 13.33 %
(c) 16.66% (d) 10 %
101. Out of sum of Rs. 625, a part was lent at 5% SI and the other at 10% SI. If the interest on the first part after 2 years is equal to the interest on the second part after 4 years, then the second part of sum (in Rs.) is:
- (a) 250 (b) 300
(c) 125 (d) 275
102. A sum of Rs. 2500 is lent out in two parts; one at 12% p.a. and other at 12.5% p.a. for one year. If the total annual income is Rs. 306, the money lent at 12% is :
- (a) 1000 (b) 1200
(c) 1500 (d) 1300
103. Rakesh yadav lent Rs. 6000 to Bhuvnesh for 2 years and Rs. 1500 to Pawan for 4 years and received altogether from both Rs. 900 as simple interest. The rate of interest is :
- (a) 4 % (b) 8 %
(c) 10 % (d) 5 %
104. Bhuvnesh takes a loan of Rs. 200 at 5% simple interest. He returns Rs. 100 at the end of one year. In order to clear his dues at the end of 2 years, he would pay :
- (a) 125.50 (b) 110
(c) 115.50
(d) none of these
105. Pawan yadav invests an amount of Rs.15,860 in the names of her three daughters A, B and C in such a way that they get the same interest after 2, 3 and 4 years respectively. If; the rate of simple interest in each condition is 5% p.a., find the ratio of invested amount to A, B and C :
- (a) 5 : 10 : 12
(b) $\frac{1}{10} : \frac{1}{15} : \frac{1}{20}$
(c) 6 : 7 : 8
(d) 6 : 5 : 4
106. What annual payment will discharge a debt of Rs. 580 in 5 years, the rate being 8% p.a.
- (a) 120 (b) 100
(c) 80 (d) 78
107. The simple interest on a certain sum $12\frac{1}{2}\%$ for 3 years is ₹3500 less than principal. Find out the principal?
- (a) Rs. 5600 (b) Rs. 6400
(c) Rs. 7200
(d) None of these



108. The simple interest on a sum at the rate of 5% for 7 years is rupees 1300 less than principal. Find the principal:
 (a) Rs. 2000 (b) Rs. 3000
 (c) Rs. 2500
 (d) None of these
109. Rakesh yadav borrowed a sum of rupees ₹6300 from Katrina at the rate 14% per annum and lent out the sum by adding some more money in it to Bhuvnesh at the rate 16%. During the whole transaction from Katrina to Bhuvnesh he earns rupees ₹618 in 3 years. Find the sum added by Rakesh yadav?
 (a) Rs. 500 (b) Rs. 400
 (c) Rs. 300
 (d) None of these
110. A man deposited Rs. 1350 in a bank at 5% per annum and Rs. 1150 in another bank at 6% per annum. Find the rate of interest for the whole sum:
 (a) 5.46 % (b) 5 %
 (c) 4.46 %
 (d) None of these
111. Bhuvnesh borrowed a sum of money from Rakesh Yadav at the rate of 8% per annum simple interest for the first 4 years 10% per annum for the next 6 years and 12% per annum for the period beyond 10 years. If he pays a total of Rs. 12160 as interest only at the end of 15 years, how much money did he borrow?
 (a) 8000 (b) 4000
 (c) 12000
 (d) None of these
112. A sum of money becomes $\frac{7}{6}$ times of itself in 3 years. Find the rate of interest ?
 (a) $4\frac{5}{9}$ % (b) $3\frac{5}{9}$ %
 (c) $5\frac{5}{9}$ % (d) None of these
113. Bhuvnesh deposits Rs. 400 for two years and Rs. 550 for 4 years and Rs. 1200 for 6 years. Find the rate of interest if he earns Rs. 1020 as simple interest?
 (a) 8 % (b) 5 %
 (c) 10 %
 (d) None of these
114. Rakesh Yadav borrows Rs. 7000 from a bank at S.I. After three years he paid Rs. 3000 to the bank and at the end of 5 years from the date of borrowing he paid Rs. 5450 to the bank to settle the account. Find the rate of interest :
 (a) 2.5 % (b) 5 %
 (c) 3.5 %
 (d) None of these
115. What annual income will discharge a debt of rupees 944 in 4 annual equal installments at the rate of 12% per annum:
 (a) Rs. 200 (b) Rs. 300
 (c) Rs. 100
 (d) None of these
116. What annual income will discharge a debt of Rs. 848 at the rate of 4% per annum in 4 annual equal installments :
 (a) Rs. 200 (b) Rs. 144
 (c) Rs. 244 (d) Rs. 164
117. A man invests same money for 3 years continuously at the rate of 11% per annum, after 3 years man got ₹ 30012 as a amount from the bank, then find what amount he invested each year?
 (a) Rs. 8200 (b) Rs. 4100
 (c) Rs. 4300
 (d) None of these
118. Rakesh Yadav wants to invest Rs. 18750 in bank account of his two sons of 12 years and 14 years respectively in such a way that they will get equal amount at an age of 18 years at the rate of 5% per annum. Find the share of younger son?
 (a) Rs. 9750 (b) Rs. 9000
 (c) Rs. 8750 (d) 10,000
119. Find the sum which is invested in 3 parts in such a way that the SI on first part at 2% for 3 years and on 2nd part at 3% for 4 years and on 3rd part at 4% for 5 years are equal. If he earns Rs. 420 as simple interest on each part then find the sum ?
 (a) Rs. 10600 (b) Rs. 8600
 (c) Rs. 12600
 (d) None of these
120. A money lender finds that due to a fall in the annual rate of interest from 8 % to $7\frac{3}{4}$ %, his yearly income diminishes by Rs. 61.50. His capital is :
 (a) Rs. 22400 (b) Rs. 23800
 (c) Rs. 24600 (d) Rs. 26000
121. The simple interest on a certain sum for 8 months at 4% per annum is Rs. 129 less than the simple interest on the same sum for 15 months at 5% per annum. The sum is:
 (a) Rs. 2,580 (b) Rs. 2400
 (c) Rs. 2529 (d) Rs. 3600
122. A certain sum by simple interest by certain fixed rate in $\frac{1}{4}$ year becomes $\frac{41}{40}$ of itself. Find rate of interest per annum.
 (a) 10% (b) 1%
 (c) 5% (d) 60%
123. If the annual rate of simple interest increases from 10 % to $12\frac{1}{2}$ %, a man's yearly income increases by Rs. 1250. His principal (in rupees) is:
 (a) 50,000 (b) 45,000
 (c) 60,000 (d) 65,000
124. The sum of money, that will give Re. 1 as interest per day at the rate of 5% per annum simple interest is :
 (a) Rs. 3650 (b) Rs. 36500
 (c) Rs. 730 (d) Rs. 7300
125. The simple interest on Rs. 7,300 from 11 May, 1987 to 10 september, 1987 (both days included) at 5 % per annum is :
 (a) Rs. 123 (b) Rs. 103
 (c) Rs. 200 (d) Rs. 223
126. A lends Rs. 2500 to B and a certain sum to C at the same time at 7 % annual simple interest. If after 4 years. A altogether receives Rs. 1120 as interest from B and C, the sum lent to C is :



- (a) Rs. 700 (b) Rs. 6500
(c) Rs. 4000 (d) Rs. 1500
127. A person invests money in three different schemes for 6 years, 10 years and 12 years at 10 percent, 12 percent and 15 percent simple interest respectively. At the completion of each scheme, he gets the same interest. The ratio of his investments is :
(a) 6 : 3 : 2 (b) 2 : 3 : 4
(c) 3 : 4 : 6 (d) 3 : 4 : 2
128. With a given rate of simple interest, the ratio of principal and amount for a certain period of time is 4 : 5. After 3 years, with the same rate of interest, the ratio of the principal and amount becomes 5 : 7. The rate of interest is :
(a) 4 % (b) 6 %
(c) 5 % (d) 7 %
129. Rs. 1,000 is invested at 5 % per annum simple interest. If the interest is added to the principal after every 10 years, the amount will become Rs. 2,000 after :
(a) 15 years (b) 18 years
(c) 20 years (d) $16\frac{2}{3}$ years
130. A borrows Rs. 800 at the rate of 12 % per annum simple interest and B borrows Rs. 910 at the rate of 10 % per annum, simple interest. In how many years will their amounts of debt be equal?
(a) 18 (b) 20
(c) 22 (d) 24
131. Bhuvnesh deposited Rs. 15600 as a fixed deposit at the rate of 10 % per annum simple interest. After every second year, he adds the interest earnings to the principal. The interest at the end of fourth year is :
(a) Rs. 3432 (b) Rs. 3744
(c) Rs. 6864 (d) Rs. 1872
132. Out of Rs. 50,000, that a man has, he lends Rs. 8000 at $5\frac{1}{2}$ % per annum simple interest and Rs. 24,000 at 6 % per annum simple interest. He lends the remaining money at a certain rate of interest so that he gets total annual interest of Rs. 3680. The rate of interest per annum, at which the remaining money was lent, is:
(a) 5 % (b) 7 %
(c) 10 % (d) 12 %
133. Rakesh Yadav invests Rs. 12,000 as fixed deposit at a bank at the rate of 10 % per annum simple interest. But due to some emergency he has to withdraw the entire money after 3 years, for which the bank allowed him a lower rate of interest. If he gets Rs. 3,320 less than what he would have got at the end of 5 years, the lower rate of interest allowed by the bank is :
(a) $7\frac{5}{9}$ % (b) $7\frac{4}{9}$ %
(c) $7\frac{8}{9}$ % (d) $8\frac{7}{9}$ %
134. A certain scheme of investment in simple interest declares that it triples the investment in 8 years. If you want to quadruple your money through that scheme, you have to invest it for :
(a) 11 years 6 months
(b) 10 years 8 months
(c) 10 years (d) 12 years
135. A sum becomes Rs. 450 in certain years by rate of 7% p.a. and it becomes Rs. 350 in same time if the rate is 5%. Find the principal and the time:
(a) Rs. 100, 50 years
(b) Rs. 200, 40 years
(c) Rs. 100, 25 years
(d) None of these
136. A certain sum in certain time by r% of rate of interest gives some simple interest, if sum is increased by 20% and rate of interest is $\frac{2}{3}$ of previous one but time is $\frac{6}{5}$, if gives Rs. 2400 as simple interest. Find the previous simple interest.
(a) Rs. 2550 (b) Rs. 3500
(c) Rs. 2500 (d) Rs. 2600

ANSWER KEY

1. (c)	15. (b)	29. (c)	43. (b)	57. (a)	71. (c)	85. (d)	99. (b)	113.(c)	127.(a)
2. (b)	16. (d)	30. (d)	44. (c)	58. (b)	72. (c)	86. (c)	100.(b)	114.(b)	128.(c)
3. (c)	17. (c)	31. (c)	45. (b)	59. (b)	73. (b)	87. (a)	101.(c)	115.(a)	129.(d)
4. (a)	18. (d)	32. (c)	46. (d)	60. (a)	74. (c)	88. (d)	102.(d)	116.(a)	130.(c)
5. (c)	19. (b)	33. (c)	47. (c)	61. (d)	75. (d)	89. (c)	103.(d)	117.(a)	131.(c)
6. (c)	20. (b)	34. (a)	48. (c)	62. (c)	76. (c)	90. (a)	104.(c)	118.(b)	132.(c)
7. (b)	21. (c)	35. (d)	49. (c)	63. (d)	77. (d)	91. (d)	105.(b)	119.(c)	133.(b)
8. (c)	22. (c)	36. (b)	50. (d)	64. (a)	78. (b)	92. (b)	106.(b)	120.(c)	134.(d)
9. (d)	23. (c)	37. (a)	51. (b)	65. (c)	79. (c)	93. (a)	107.(a)	121.(d)	135.(a)
10. (b)	24. (d)	38. (d)	52. (d)	66. (c)	80. (b)	94. (c)	108.(a)	122.(a)	136.(c)
11. (b)	25. (a)	39. (d)	53. (b)	67. (a)	81. (b)	95. (c)	109.(a)	123.(a)	
12. (b)	26. (d)	40. (c)	54. (d)	68. (a)	82. (c)	96. (c)	110.(a)	124.(d)	
13. (c)	27. (d)	41. (d)	55. (c)	69. (c)	83. (c)	97. (d)	111.(a)	125.(a)	
14. (c)	28. (c)	42. (d)	56. (c)	70. (b)	84. (c)	98. (b)	112.(c)	126.(d)	

Solution

1. (c) $P = ₹3600$, $r = \frac{25}{4}\%$,

$t = \frac{7}{3}$ years

so, $SI = \frac{P \times r \times t}{100}$

$= \frac{3600}{100} \times \frac{25}{4} \times \frac{7}{3} = ₹525$

Hence the total amount A
 $= P + SI = 3600 + 525$
 $= ₹4125$

Alternatively

$SI = r \times t\% = \frac{25}{4} \times \frac{7}{3} = \frac{175}{12}\%$

Total amount A = P + A

$= 100\% + \frac{175}{12}\% = \frac{1375}{12}\%$

$= \frac{1375}{12} \times \frac{3600}{100} = ₹4125$

2. (b) $P = ₹5,000$, $r = 5\%$

$t = 146 \text{ days} = \frac{146}{365} = \frac{2}{5}$ years

So, $SI = \frac{5,000 \times 5 \times 2}{100 \times 5} = ₹100$

Hence praveen got ₹100 as interest from the post office.

3. (c) Let ₹7500 was taken at $r\%$ so ₹4500 was taken at $(r+1)\%$

Now,

Principal $\rightarrow$ 7500 4500
 $\downarrow r\%$ $\downarrow (r+1)\%$

Interest $\rightarrow 3r\% + 3(r+1)\%$

$\rightarrow 225r + 135r + 135 = 1575$

So, $225r + 135r = 1575 - 135$
 $360r = 1440$

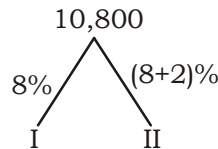
$\Rightarrow \boxed{r = 4\%}$

The rate at which 4500 is taken = $4\% + 1\% = 5\%$

[Note: Here we note that Interest = rate $\times$ time%]

4. (a) S.I for two years = ₹1908
S.I for one year = ₹954

Now,



Interest of one year

$\Rightarrow 8\% \text{ of whole} + 2\% \text{ of II} = 954$

$\frac{8 \times 10800}{100} + 2\% \text{ of II} = 954$

$2\% \text{ of II} = 954 - 864$

$2\% \text{ of II} = 90$

$100\% \text{ of II} = ₹4500$

$II = ₹4500$

$\Rightarrow I = 10800 - 4500$

$I = ₹6300$

Alternate

(10%) (8%)
1080 864

954 (1 Year)

90 126
5 7

$\therefore$ Total $(5 + 7 = 10800)$

$\therefore 5 = \frac{10800}{12} \times 5 = 4500$

$7 = \frac{10800}{12} \times 7 = 6300$

5. (c) S.I on the first part = $5 \times 8\%$
 $= 40\% \text{ of I}$

S.I on the second part

$= 4 \times 10\% = 40\% \text{ of II}$

But, according to the question,

$40\% I = 3 \times 40\% II$

$$\frac{I}{II} = \frac{3}{1}$$

So, the required difference (I-II)

$$= \frac{(3-1)}{4} \times 12,000$$

$$= \frac{2}{4} \times 12,000 = ₹ 6,000$$

6. (c) Amount received from the first bank

$$= 8 \times \frac{12600}{100} \times 1 = ₹ 1008$$

Amount received from the second bank

$$= 6 \times \frac{4200}{100} \times 1 = ₹ 252$$

Total amount received

$$= 1008 + 252 = ₹ 1260$$

Hence effective annual rate on the whole amount

$$= \frac{1260}{(12600 + 4200)} \times 100$$

$$= \frac{1260}{16800} \times 100 = 7.5\%$$

7. (b) S.I of three years = 1350 - 1200 = ₹ 150

S.I of 6 years = ₹ 300

Principal = Amount - S.I

Hence the amount

$$= 1200 - 300 = ₹ 900$$

We know that S.I of 1 years = ₹ 50

Hence the rate of interest

$$= \frac{50}{900} \times 100 = 5\frac{5}{9}\%$$

8. (c) Since simple interest is half of the amount

$$\text{Hence S.I.} = 50\% = r \times t\%$$

$$\Rightarrow r \times 8 = 50\%$$

$$\text{Rate of interest } r = 6\frac{1}{4}\%$$

Again if the principal be p then,

$$p + \frac{p}{2} = 30,000$$

Hence the principal p

$$= ₹ 20,000$$

9. (d) Interest in first condition

$$= 7\frac{1}{2} \times 6\%$$

$$= \frac{15}{2} \times 6\% = 45\%$$

Hence total amount in first condition = 145%

Interest in second condition = 10 × 6% = 60%

Total amount in second condition = 160%

But

$$145\% \rightarrow 11600$$

$$160\% \rightarrow \frac{160}{145} \times 11600$$

$$= ₹ 12,800$$

Hence the required amount = ₹ 12,800

10. (b)

$$\begin{array}{c} \text{Principal} \\ \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\ 2000 + 2500 + 3500 = 8000 \\ \downarrow 5\% \quad \downarrow 10\% \quad \downarrow r\% \quad \downarrow 8\% \\ 100 + 250 + 35r = 640 \end{array}$$

$$\Rightarrow \begin{array}{c} \text{Interest} \\ 35r = 640 - 350 \\ 35r = 290 \end{array}$$

Hence the required rate

$$= 8\frac{2}{7}\%$$

11. (b) Interest received in two years = ₹ 1430

Interest received in one year = ₹ 715

Also, the interest of one year

$$= \frac{1}{3} \times 7\% + \frac{2}{5} \times 10\% + \frac{4}{15} \times 12\%$$

$$= \left(\frac{7}{3} + 4 + \frac{16}{5} \right) \%$$

$$\text{Hence } \frac{143}{15} \% \rightarrow 715$$

$$100\% \rightarrow \frac{15}{143} \times 100 \times 715$$

$$= ₹ 7500$$

Hence required amount = ₹ 7500

12. (b) Simple interest on Ist part = 8 × 5% = 40%

Simple interest on IInd part = 4 × 9% = 36%

Now by question,

$$\frac{40\% \times I}{36\% \times II} = \frac{3}{7}$$

$$\frac{I}{II} = \frac{27}{70}$$

Hence the second part (II)

$$= \frac{70}{97} \times 19400 = ₹ 14,000$$

13. (c) Let the three parts be A, B and C

Then

Part A becomes after 2 years

$$= (100 + 2 \times 10)$$

$$= 120\%$$

Part B becomes after 4 years

$$= (100 + 4 \times 10)$$

$$= 140\%$$

and part C becomes after 5 years

$$= (100 + 5 \times 10) = 150\%$$

Now by question,

$$A \times 120\% = B \times 140\% = C \times 150\%$$

$$= K \text{ (let)}$$

$$A : B : C = \frac{K}{120} : \frac{K}{140} : \frac{K}{150} = 35 : 30 : 28$$

$$A = \frac{35}{(35+30+28)} \times 18600 = ₹ 7000$$

$$B = \frac{30}{(35+30+28)} \times 18600 = ₹ 6,000$$

$$C = \frac{28}{(35+30+28)} \times 18600 = ₹ 5,600$$

14. (c) Let the rate of interest be r% per annum and the time is t years.

Then, Interest on x = r × t of x

$$\Rightarrow y = (r \times t) \times x \%$$

$$\Rightarrow \frac{y}{x} = r \times t\% \quad \dots(i)$$

Interest on y = r × t% of y

$$z = r \times t \times y\%$$

$$\frac{z}{y} = r \times t\% \quad \dots(ii)$$

$$\text{by (i) and (ii) } \frac{y}{x} = \frac{z}{y}$$

$$\boxed{y^2 = xz}$$

15. (b) Let the sum be 100% and he lent it for t years to the first

and $\left(t - \frac{1}{2}\right)$ years to the second person.

The amount received from first person

$$= (100 + 5 \times t)\%$$

and the amount received from second person

$$= \left[100 + 6\left(t - \frac{1}{2}\right)\right]\%$$

But by question,

$$100 + 5 \times t = 100 + 6\left(t - \frac{1}{2}\right)$$

$$\Rightarrow t = 3 \text{ years}$$

Hence amount received from each person

$$= 100 + 5 \times 3 = 115\%$$

$$100 + 6 \times 2\frac{1}{2} = 115\%$$

or

$$115\% \rightarrow ₹4600$$

$$\Rightarrow 100\% \rightarrow ₹4000$$

Hence the sum lent to each person = ₹4000

16. (d) Interest on the remaining sum = $8 \times 2\% = 16\%$

By question,

$$116\% \rightarrow 13920$$

$$100\% \rightarrow \frac{100}{116} \times 13920 = 12000$$

So, the remaining cost = ₹12000

Total cost of the bike

$$= 15,000 + 12,000 = ₹27,000$$

17. (c) Let the amounts be P_1 and P_2 . Then

$$\frac{P_1}{4} = \frac{P_2}{5}$$

$$\frac{P_1}{P_2} = \frac{4}{5}$$

$$\text{Take } P_1 = 4x \quad P_2 = 5x$$

$$\text{Interest for first} = 6 \times 2\% = 12\%$$

$$\text{Interest for second} = 7 \times 2\% = 14\%$$

But

$$12\% \text{ of } 4x + 14\% \text{ of } 5x = 2478$$

$$\frac{12 \times 4x}{100} + \frac{14 \times 5x}{100} = 2478$$

$$\frac{118x}{100} = 2478$$

$$x = 2100$$

Total amount lent out

$$= 4x + 5x = 9x$$

$$= 9 \times 2100 = ₹18,900$$

18. (d) Total interest = $(3 \times 7 + 4 \times 9 + 5 \times 4)\%$

$$= (21 + 36 + 20)\% = 77\%$$

But

$$77\% \rightarrow 2772$$

$$100\% \rightarrow \frac{100}{77} \times 2772 = ₹3600$$

Hence the amount lent out is ₹3600

19. (b) Let the rate of interest be $r\%$
Total interest is given by 7000

$$\times \frac{3 \times r}{100} + 10000 \times \frac{5 \times r}{100} = 4615$$

$$210r + 500r = 4615$$

$$r = 6.5\%$$

20. (b) Let the amount taken on loan = x .

Interest in the first year

$$= \frac{x \times 6}{100} = \frac{6x}{100}$$

Total money in the first year

$$= \frac{106x}{100}$$

Money left for the next year =

$$\left(\frac{106x}{100} - 6800\right)$$

Interest in the second year

$$= \frac{5}{100} \times \left[\frac{106}{100}x - 6800\right]$$

Now according to the question,

$$\frac{5}{100} \times \left[\frac{106}{100}x - 6800\right]$$

$$= \frac{11}{20} \times \frac{6x}{100}$$

$$\left[\frac{106}{100}x - 6800\right] = 11 \times \frac{6x}{100}$$

$$\frac{106x - 66x}{100} = 6800$$

$$\frac{40x}{100} = 6800$$

$$x = ₹17000$$

21. (c) Let the amount be x , rate be $r\%$ and time be t years

Interest received in the first case

$$SI_1 = \frac{x \times r \times t}{100} \dots\dots (i)$$

$$\text{But Now, } P = \frac{120}{100}x = \frac{6}{5}x, \quad R$$

$$= \frac{2}{3}r, \quad T = \frac{6}{5}t$$

So, the new interest

$$SI_2 = \frac{\frac{6}{5}x \times \frac{2}{3}r \times \frac{6}{5}t}{100}$$

$$= \frac{24}{25} \times \frac{x \times r \times t}{100}$$

(From equation no (i))

$$SI_2 = \frac{24}{25} \times SI_1$$

$$\frac{SI_2}{SI_1} = \frac{24}{25}$$

$$\frac{2400}{SI_1} = \frac{24}{25}$$

$$\Rightarrow SI_1 = ₹2500$$

22. (c) Interest for the first year

$$= \frac{30,000 \times 4 \times 1}{100} = 1200$$

The installment paid in the last of first year

$$= \left(\frac{1}{3} \times 30,000 + 1200\right)$$

$$= ₹11200$$

The money left after one year

$$= (30,000 - 10,000) = ₹20,000$$

Interest for the second year =

$$\frac{20,000 \times 4 \times 1}{100} = ₹800$$

The installment paid in the last of second year

$$= \left(\frac{1}{2} \times 20,000 + 800\right) = 10800$$

Now the money left after 2 year = ₹10,000

Interest in the third year

$$= \frac{10,000 \times 4 \times 1}{100} = ₹400$$

The installment paid in the last of three year

$$= 10,000 + 400 = ₹10400$$

23. (c) The amount becomes 4 times this means the interest received = $r \times t\% = 300\%$
 $8 \times t\% = 300\%$

$$t = \frac{300}{8} = 37\frac{1}{2} \text{ years.}$$

To make amount 10 times the interest = 900%

$$r \times t\% = 900\%$$

$$r \times 37\frac{1}{2} = 900\%$$

$$r = \frac{900 \times 8}{300} = 24\%$$

24. (d) Let the amount be x then
 Interest received on $x = 5 \times$

$$3\frac{1}{2}\% = 17.5\% \text{ of } x$$

Interest received on 1400

$$= 4 \times 2\frac{1}{2}\% = 10\%$$

$$= ₹140$$

$$17.5\% \rightarrow ₹140$$

$$100\% \rightarrow \frac{100}{17.5} \times 140 = ₹800$$

Hence the amount is ₹800

25. (a) Let the rate of interest be $r\%$ and time be t years

The interest received

$$= \frac{29}{25} - 1 = \frac{4}{25} = 16\%$$

$$r \times t\% = 16\%$$

$$r \times r\% = 16\% \quad [t = r]$$

rate of interest

$$\boxed{r = 4\%}$$

26. (d) Let the amount be P and rate of interest be $r\%$ then
 Interest received

$$= \frac{1}{4} P = 25\% \text{ of } P$$

But interest = $r \times t\%$

So, $r \times 5\% = 25\%$ [$t = 5$ years]

$$r = 5\%$$

We know that $p + \frac{p}{4} = 3000$

$$\frac{5p}{4} = 3000$$

$$p = ₹2400$$

27. (d) Let the amount be p .
 Interest received in first case

$$= 4 \times 6\frac{1}{4}\% = 25\%$$

Total amount in first case

$$= (100 + 25)\% = 125\% \text{ of } p.$$

$$125\% \rightarrow 3000$$

$$100\% \rightarrow \frac{100}{125} \times 3000 = ₹2400$$

Hence $P = ₹2400$

Interest received in the second case

$$= 6\frac{2}{3} \times 5\frac{1}{2}\%$$

$$= \frac{20}{3} \times \frac{11}{2}\% = \frac{110}{3}\%$$

$$\text{Total amount} = 100 + \frac{110}{3} = \frac{410}{3}\%$$

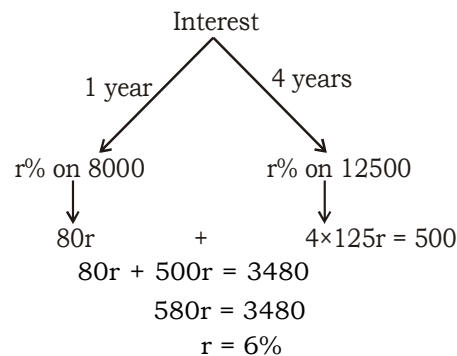
$$100\% \rightarrow 2400$$

$$\frac{410}{3}\% \rightarrow \frac{410}{3 \times 100} \times 2400$$

$$= 3280$$

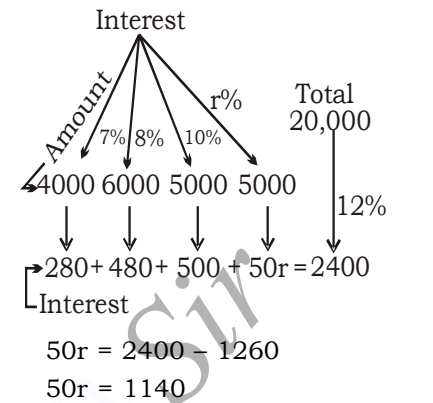
Hence the required amount = ₹3280

28. (c) Let the rate be $r\%$ per annum



Hence the required rate = 6% per annum

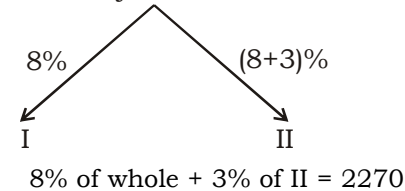
29. (c)



30. (d) Interest of four years = ₹9080

Interest of one year = ₹2270

One year interest



$$\frac{8 \times 25000}{100} + 3\% \text{ of II} = 2270$$

$$3\% \text{ of II} = 2270 - 2000 = 270$$

$$100\% \text{ of II} = \frac{100}{3} \times 270$$

$$\text{II} = 9000$$

$$\text{Hence I} = 25000 - 9000 = 16000$$

So, he lent out ₹16000 at 8% and ₹9000 at 11%

Alternatively

One year interest

$$= \frac{9080}{4} = 2270$$

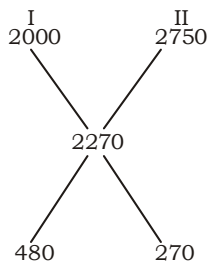
One year interest if the whole amount is lent out at 8%

$$= \frac{8 \times 25000}{100} = 2000$$

One year interest of the whole amount is lent out at 11%

$$= \frac{11 \times 25000}{100} = 2750$$

Now by alligation rule,



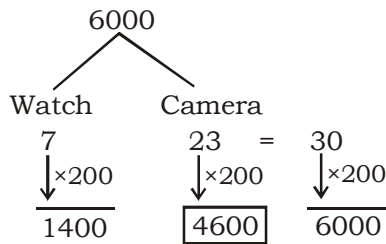
$$\begin{array}{ccc} 16 & : & 9 \\ \downarrow \times 1000 & & \downarrow \times 1000 \\ 16000 & & 9000 \end{array} \quad \begin{array}{ccc} 25 & & \\ \downarrow \times 1000 & & \\ 25000 & & \end{array}$$

Hence the amount at 8% = ₹16000 and the amount at 11% = ₹9000.

31. (c) The amount of interest

$$= 10,000 \times \frac{12 \times 5}{100} = ₹6000$$

Now,



Hence, the cost of camera = ₹ 4600

32. (c) Difference of interest in $\frac{5}{2}$ years = 6850

$$\text{Difference of interest in 1 year} = \frac{2}{5} \times 6850 = ₹ 2740$$

Hence,

$$1.37\% \longrightarrow 2740$$

$$1\% \longrightarrow \frac{2740}{1.37} = 2000$$

$$100\% \longrightarrow 100 \times 2000 = ₹2,00,000$$

33. (c) Let the rate charged by Rakesh and Bhuvnesh are $3r\%$ and $5r\%$ respectively.

Then interest received by Rakesh

$$= \frac{5400 \times 3r \times 4}{100} = 648r$$

and, interest received by Bhuvnesh

$$= \frac{7200 \times 5r \times 3}{100} = 1080r$$

$$\begin{aligned} \text{But by question, } 648r + 1080r \\ = 3456 \end{aligned}$$

$$1728r = 3456$$

$$r = 2$$

Hence the rate charged by Bhuvnesh = $5r\%$ = 10%

34. (a) Let Rakesh lent out at $r\%$ and Kareena at $k\%$.

Then, Interest received by Rakesh

$$= \frac{14400 \times r}{100} \times \frac{27}{8} = 486r$$

Interest received by Kareena

$$\begin{aligned} &= \frac{16200 \times k \times 3}{100} \\ &= 486k \end{aligned}$$

Difference between the interest = 1458 (Given)

$$486k - 486r = 1458$$

$$486(k - r) = 1458$$

Hence, the required difference $(k - r) = 3\%$

35. (d) Interest received in $3\frac{1}{2}$ years = $6441 - 5650 = ₹ 791$

Interest received in 1 year

$$= \frac{791}{7} \times 2 = 113 \times 2 = 226$$

$$\begin{aligned} \text{Rate of interest} &= \frac{226}{5650} \times 100 \\ &= 4\% \end{aligned}$$

Interest received in the second case

$$= 8418.50 - 5650 = 2768.50$$

Rate of interest

$$= \frac{2 \times 2768.50}{7 \times 5650} \times 100 = 14\%$$

Hence the increment in the rate of interest

$$= (14 - 4) = 10\%$$

36. (b) Ratio of rates = 4 : 5

$$\text{Ratio of time} = 2\frac{1}{2} : 3\frac{1}{2} = 5 : 7$$

Let rate for y is $4r\%$ and time be $5t$ years while rate for z is $5r\%$ and time be $7t$ years.

$$\text{Interest paid by y} = \frac{y \times 4r \times 5t}{100}$$

$$\text{Interest paid by z} = \frac{z \times 5r \times 7t}{100}$$

But by question,

$$\frac{y \times 4r \times 5t}{100} = \frac{z \times 5r \times 7t}{100}$$

$$\frac{y}{z} = \frac{7}{4}$$

Hence amount taken by y

$$= \frac{7}{(7+4)} \times 22000 = ₹14000$$

Amount taken by z

$$= \frac{4}{(7+4)} \times 22000 = ₹8000$$

37. (a) Let he lent A to first person and B to second.

$$\text{By question, } \frac{\frac{A \times 7 \times 4}{100}}{\frac{B \times 10 \times 2}{100}} = \frac{4}{5}$$

$$\frac{7A}{5B} = \frac{4}{5} \Rightarrow \frac{4}{7}$$

Amount given to first person A

$$= \frac{4}{11} \times 44000 = ₹16000$$

38. (d) Let two parts be A and B respectively.

Then by question,

$$A \times \frac{9}{2} \times \frac{3}{100} = B \times \frac{6}{100} \times \frac{9}{5}$$

$$\frac{A}{B} = \frac{4}{5}$$

$$\therefore A + B = 9 = 2250 \text{ and } A - B = 1$$

Hence the required difference (B - A)

$$= \frac{(5-4)}{(5+4)} \times 2250 = \frac{1}{9} \times 2250 = ₹250$$

39. (d) Let the initial amount is P and rate of interest be r% per annum and time is t years.

Then interest received

$$= \frac{p \times r \times t}{100} = 1250 \quad \dots (i)$$

$$\text{Now new amount} = \frac{140}{100}P = \frac{7}{5}P$$

$$\text{New rate} = \frac{3}{2}r$$

$$\text{New time} = \frac{4}{7}t$$

New interest received

$$= \frac{7}{5}P \times \frac{3}{2}r \times \frac{4}{7} = \frac{6}{5} \times \frac{p \times r \times t}{100}$$

(From equation no.(i))

$$= \frac{6}{5} \times 1250 = 1500$$

Hence the required interest amount = ₹ 1500

40. (c) Let the four persons get A, B, C and D amounts respectively.

Then by question,

$$A \times \frac{120}{100} = B \times \frac{140}{100} = C \times \frac{160}{100} =$$

$$D \times \frac{200}{100} = K \text{ (Let)}$$

$$A : B : C : D$$

$$= \frac{K}{12} : \frac{K}{14} : \frac{K}{16} : \frac{K}{20}$$

(LCM of 12, 14, 16, 20 = 1680)

$$= 140 : 120 : 105 : 84$$

Required difference

$$= \frac{(140-84)}{(140+120+105+84)} \times 44900$$

$$= \frac{56}{449} \times 44900 = ₹ 5600$$

41. (d) Interest paid by Bhuvnesh

$$= 50,000 \times \frac{13}{2} \times \frac{3}{100} = 9750$$

Interest received by Bhuvnesh

$$= 60,000 \times \frac{7}{100} \times \frac{7}{2} = 14700$$

Profit of Bhuvnesh

$$= 14700 - 9750 = 4950$$

Cost of a fan

$$= \frac{28}{(28+15+7)} \times 4950$$

$$= ₹ 2772$$

Cost of a table

$$= \frac{15}{(28+15+7)} \times 4950$$

$$= ₹ 1485$$

Cost of a calculator

$$= \frac{7}{(28+15+7)} \times 4950 = ₹ 693$$

42. (d) By question,

$$A \times \frac{4 \times 7}{100} = B \times \frac{5 \times 7}{100}$$

$$= C \times \frac{10 \times 7}{100} = K \text{ (Let)}$$

$$A : B : C$$

$$= \frac{K}{4} : \frac{K}{5} : \frac{K}{10}$$

$$= 5 : 4 : 2$$

Amount received by A

$$= \frac{5}{11} \times 33220 = ₹15100$$

Amount received by B

$$= \frac{4}{11} \times 33220 = ₹ 12080$$

Amount received by C

$$= \frac{2}{11} \times 33220 = ₹ 6040$$

43. (b) Interest paid by B = 8 × 2

$$= 16 \%$$

Interest paid by C = (8 + 3) × 2 = 22%

Profit earned by B = (22 - 16) = 6%

Hence the required profit of B

$$= \frac{6 \times 4800}{100} = ₹ 288$$

44. (c) Let the second amount was borrowed for t years then the first amount was borrowed for

$$\left(t - \frac{1}{2}\right) \text{ years.}$$

Interest paid on first = Interest on second

$$9 \times \left(t - \frac{1}{2}\right) \% = 8 \times t \%$$

$$t = \frac{9}{2} \text{ years} = 4\frac{1}{2} \text{ years}$$

$$\text{and } \left(t - \frac{1}{2}\right) = 4 \text{ years}$$

Hence interest paid by each

$$= 9 \times 4 = 36\%$$

$$\text{or } 8 \times 4\frac{1}{2} = 36\%$$

Total amount = 136 %

$$\text{But } 136\% \rightarrow 17680$$

$$100\% \rightarrow \frac{100}{136} \times 17680 = 13000$$

Hence each amount borrowed was ₹13000.

45. (b) Let the remaining amount to be paid = x

$$\text{Then interest in 3 years on } x = 3 \times 8 = 24\%$$

Hence the amount become

$$= (100 + 24)\% = 124\%$$

But, 124% of $x = 49600$

$$100\% \text{ of } x = \frac{100}{124} \times 49600$$

$$\Rightarrow x = 40,000$$

Hence the cost at which Rohit bought the car

$$= 30,000 + 40,000 = ₹70,000$$

46. (d) Let the amount lent out was x

Amount after one year

$$= \frac{108}{100}x$$

Since, Interest of one year

$$= \frac{8}{100}x$$

Amount left after one year

$$= \frac{108}{100}x - 4680$$

Interest of the second year

$$= \frac{7}{100} \left(\frac{108}{100}x - 4680 \right)$$

Now by question,

$$\frac{7}{100} \left(\frac{108}{100}x - 4680 \right) = \frac{3}{4} \times \frac{8}{100}x$$

$$\Rightarrow x = ₹21,000$$

47. (c) Interest received on ₹1500
 $= 1680 - 1500 = ₹180$

Interest percentage

$$= \frac{180}{1500} \times 100 = 12\%$$

But Interest percentage = $r \times t\%$

$$\text{So, } 4 \times t = 12$$

$$\Rightarrow t = 3 \text{ years}$$

Now let the certain amount be x .

interest received on it

$$= 3 \times 5 = 15\%$$

$$\text{Total amount} = (100 + 15)$$

$$= 115\%$$

$$115\% \text{ of } x = 1150$$

$$\Rightarrow 100\% \text{ of } x = 1000$$

Hence the certain amount is ₹ 1000.

48. (c) Interest paid to y

$$= \frac{1200 \times 5 \times 3}{100} = ₹180$$

Interest paid to z

$$= \frac{1600 \times 4 \times 3}{100} = ₹192$$

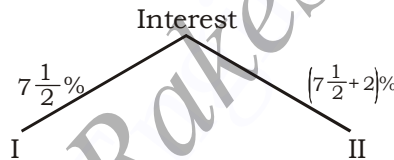
$$\begin{aligned} \text{Total amount paid by } x &= 180 + 192 \\ &= ₹ 372 \end{aligned}$$

Total actual amount paid by x

$$= \frac{99}{100} \times 372 = ₹ 368.28$$

49. (c) Interest received in one year

$$= \frac{3000}{3} = ₹1000$$



$$\begin{aligned} \Rightarrow 7 \frac{1}{2} \% \text{ of whole} + 2\% \text{ of II} \\ = 1000 \end{aligned}$$

$$\frac{15}{2} \times \frac{12000}{100} + 2\% \text{ of II} = 1000$$

$$900 + 2\% \text{ of II} = 1000$$

$$2\% \text{ of II} = 100$$

$$100\% \text{ of II} = 5000$$

$$\text{Hence second part} = 5000$$

$$\text{first part} = 7000$$

Required difference

$$= 7000 - 5000 = ₹ 2000$$

Alternate

$$7 \frac{1}{2} \% \text{ of } 12000 \quad 9 \frac{1}{2} \% \text{ of } 12000$$

$$900 \quad 1140$$

1000 Actual Profit

$$\frac{140}{7} : \frac{100}{5}$$

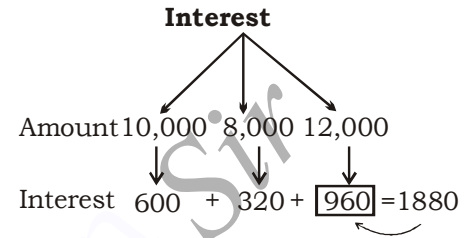
$$\therefore \text{Total} = 7 + 5 = 12 = 12000$$

$$\therefore 7 = 7000 \text{ and } 5 = 5000$$

Required difference

$$= 7000 - 5000 = \text{Rs. } 2000$$

50. (d)



Interest received on 12000

$$= 1880 - 920 = 960$$

Hence the rate of interest

$$= \frac{960}{12000} \times 100 = 8\%$$

51. (b) Total interest received

$$\left[1 - \left(\frac{2}{5} + \frac{3}{7} \right) \right] = \frac{6}{35}$$

$$= \left(\frac{2}{5} \times 15 + \frac{3}{7} \times 10 + \frac{6}{35} \times 26 \right) \%$$

$$= \frac{516}{35} \%$$

$$\frac{516}{35} \% \longrightarrow 10320$$

$$100\% \longrightarrow 10320 \times$$

$$\frac{35}{516} \times 100$$

$$\text{Total amount} = 70,000$$

The amount lent out at 15%

$$= \frac{2}{5} \times 70,000 = ₹28,000$$

$$52. (d) \text{ By question, } x = \frac{p \times r \times t}{100}$$

and

$$y = \frac{\frac{3p}{2} \times \frac{4}{5}r \times \frac{7}{6}t}{100}$$

$$y = \frac{7}{5} \times \frac{p \times r \times t}{100}$$

$$\Rightarrow y = \frac{7}{5}x$$

$$\text{Required percentage} = \frac{y}{x} \times 100$$

$$= \frac{\frac{7}{5}x}{x} \times 100 = 140\%$$

$$53. (b) \text{ Interest received} = \frac{22 \times 6\%}{100} = 132\%$$

$$\text{Difference between interest and principal amount} = 32\%$$

$$\begin{array}{lcl} \text{But } 32\% & \longrightarrow & 2560 \\ 100\% & \longrightarrow & 8000 \end{array}$$

$$\text{Hence the principal amount} = 8000$$

$$\text{the interest received} = 8000 + 2560 = 10560$$

$$\begin{array}{l} \text{Total amount to be repaid} \\ = 8000 + 10560 = ₹ 18560 \end{array}$$

$$54. (d) \text{ By question,}$$

$$A \times \frac{(100 + 2 \times 15)}{100}$$

$$= B \times \frac{(100 + 4 \times 5)}{100}$$

$$= C \times \frac{(100 + 5 \times 3)}{100}$$

$$A \times \frac{130}{100} = B \times \frac{120}{100}$$

$$= C \times \frac{115}{100} = K \text{ (let)}$$

$$A : B : C = \frac{K}{130} : \frac{K}{120} : \frac{K}{115}$$

$$= 276 : 299 : 312$$

$$A = \frac{276}{(276 + 299 + 312)} \times 35480 = 11040$$

$$B = \frac{299}{(276 + 299 + 312)} \times 35480 = 11960$$

$$C = \frac{312}{(276 + 299 + 312)} \times 35480 = 12480$$

$$55. (c) \text{ Let the amount deposited each year} = x$$

$$\text{Then the interest in 3 years}$$

$$\Rightarrow 3 \times \frac{11x}{100} + 2 \times \frac{11x}{100} + \frac{11x}{100}$$

$$\Rightarrow \frac{(33x + 22x + 11x)}{100} = \frac{66x}{100}$$

$$\text{Total amount after 3 years}$$

$$= \frac{66x}{100} + 3x = \frac{366x}{100}$$

$$\text{But, } \frac{366x}{100} = 30012$$

$$\Rightarrow x = 8200$$

$$\text{Hence, he deposits ₹ 8200 each year.}$$

$$56. (c) a = \frac{b \times r \times t}{100}$$

$$b = \frac{c \times r \times t}{100} \Rightarrow \frac{b}{c} = \frac{r \times t}{100} \dots (i)$$

$$d = \frac{c \times 100}{r \times t}$$

$$\frac{a}{d} = \frac{\frac{b \times r \times t}{100}}{\frac{c \times 100}{r \times t}} = \frac{b}{c} \times \left(\frac{r \times t}{100} \right)^2$$

$$= \frac{b}{c} \times \left(\frac{b}{c} \right)^2 = \frac{b^3}{c^3}$$

$$\text{Hence the required ratio } a : d = b^3 : c^3$$

$$57. (a)$$

$$\text{Interest} = \frac{41}{40} - 1 = \frac{1}{40} = 2.5\%$$

$$\text{But interest} = r \times t\% = \frac{1}{4} r\%$$

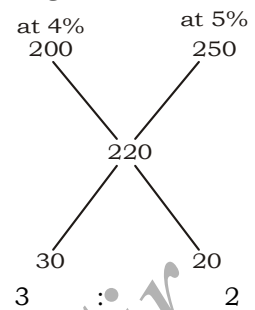
$$\frac{1}{4} \times r = 2.5\%$$

$$\text{Hence the required rate } \boxed{r = 10\%}$$

$$58. (b) \text{ Interest in one year}$$

$$= \frac{440}{2} = 220$$

By alligation rule,



Hence the required ratio is 3 : 2

$$59. (b) \frac{4}{9} p = \frac{p \times r \times t}{100}$$

$$\frac{400}{9} = r \times t$$

$$r^2 = \frac{400}{9}$$

$$r = \frac{20}{3} = 6\frac{2}{3}\%$$

Note: This type of question can be solved directly

$$\text{as } r = \sqrt{\frac{4}{9} \times 100} = \frac{20}{3} = 6\frac{2}{3}\%$$

$$60. (a) \text{ Decrease in interest rate} = (11.50 - 10)\% = 1.50\%$$

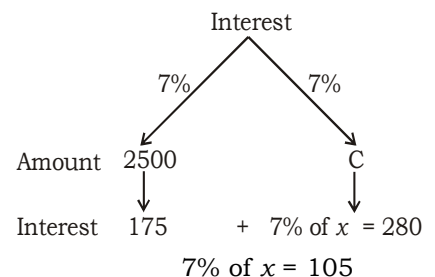
But

$$1.50\% \rightarrow 55.50$$

$$100\% \rightarrow \frac{100}{1.50} \times 55.50 = 3700$$

$$\text{Hence the required amount} = ₹ 3700$$

$$61. (d) \text{ Interest received in 1 year} = \frac{1120}{4} = 280$$



$$100\% \text{ of } x = \frac{100}{7} \times 105$$

$$x = 1500$$

Hence the money lent out to C
= ₹1500

62. (c) Difference in three year
= 13.50

Difference in one year

$$= \frac{13.50}{3} = ₹ 4.50$$

Difference of rate

$$= \frac{4.50}{1500} \times 100 = 0.3\%$$

63. (d) Interest received in one year

$$= \frac{760}{2} = 380$$

$$10\% \text{ of } x + 9\% \text{ of } x = 380$$

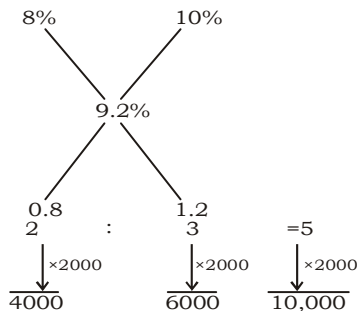
$$19\% \text{ of } x = 380$$

$$100\% \text{ of } x = 2000$$

Hence the required amount

$$= ₹ 2000$$

64. (a) By alligation rule,



Hence the two parts are ₹ 4000 and ₹ 6000 respectively.

65. (c) Interest received in one year

$$= \frac{480}{4} = 120$$

$$\text{But } 12\% \text{ of } 500 + 10\% \text{ of } x = 120$$

$$60 + 10\% \text{ of } x = 120$$

$$\frac{x}{10} = 60$$

$$x = 600$$

Hence the another amount = ₹ 600

66. (c) According to question,

$$\frac{I \times 10 \times 5}{100} = \frac{II \times 12.5 \times 4}{100}$$

$$\Rightarrow I = II$$

$$\text{Hence each part} = \frac{1500}{2}$$

$$= ₹ 750$$

67. (a) Total interest received = $(12 \times 3 + 16 \times 5 + 20 \times 3)\%$
= 176%

Difference between interest and principal amount

$$= (176 - 100)\% = 76\%$$

$$\text{But } 76\% \rightarrow 6080$$

$$100\% \rightarrow \frac{100}{76} \times 6080 = 8000$$

Hence the amount borrowed by Bhuvnesh = ₹ 8000

68. (a) Let first part be A and second be B.

Then by question,

$$\frac{A \times 12 \times 3}{100} = B \times \frac{16 \times 9}{100 \times 2}$$

$$\frac{A}{B} = \frac{72}{36} = \frac{2}{1}$$

Hence the greater part A

$$= \frac{2}{(2+1)} \times 12,000 = ₹ 8,000$$

69. (c) Let the required rate be r%

Then

$$4000 \times \frac{5}{100} + 3500 \times \frac{4}{100} +$$

$$2500 \times \frac{r}{100} = 500$$

$$200 + 140 + 25r = 500$$

$$25r = 160$$

$$r = 6.4\%$$

Hence the required rate = 6.4%

70. (b) Since the amount become 3 times. It means that the simple interest = 200%

$$\text{but interest} = r \times t\%$$

$$r \times 4 = 200\%$$

$$r = 50\%$$

To make it 7 times the interest = 600%

$$\text{but } r \times t\% = 600\%$$

$$60 \times t = 600\%$$

$$t = \frac{600}{50} = 12 \text{ years}$$

Hence it will become 7 times in 12 years

Alternate

$$\text{I case } 100\% \quad 300\%$$

$$\quad \quad \quad 200\%$$

$$r = \frac{200}{4} = 50\%$$

$$\text{II case } 100\% \quad 700\%$$

$$\quad \quad \quad 600\%$$

$$\text{Time} = \frac{600}{50} = 12 \text{ Years}$$

71. (c) Total interest = $(3 \times 5 + 4 \times 6 + 2 \times 3)\%$
= $(15 + 24 + 6)\% = 45\%$

But

$$45\% \rightarrow 1350$$

$$100\% \rightarrow \frac{100}{45} \times 1350 = ₹ 3000$$

Hence the total amount lent out = ₹ 3000

72. (c) Simple interest of 2 years
 $3000 - 2800 = 200$

So the interest of 3 years = 300

Hence the amount

$$= 2800 - 300 = 2500$$

Rate of interest

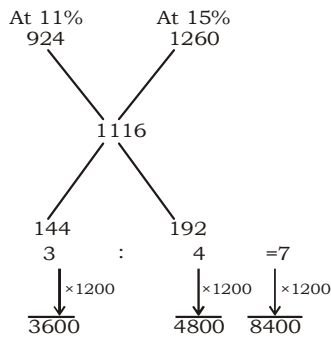
$$= \frac{\text{interest of one year}}{\text{amount}} \times 100$$

$$= \frac{100}{2500} \times 100 = 4\%$$

73. (b) Interest of one year

$$= \frac{2232}{2} = 1116$$

Now by alligation rule



Hence the part lent out at 11% = ₹ 3600 and the part lent out at 15% = ₹ 4800

Alternate

$$11\% \text{ of } I + 15\% \text{ of } II = 1116$$

$$11\% \text{ of } I + 11\% \text{ of } II + 4\% \text{ of } II = 1116$$

$$11\% \text{ of } (I + II) + (4\% \text{ of } II) = 1116$$

$$924 + 4\% \text{ of } II = 1116$$

$$\therefore (I + II = 8400)$$

$$4\% \text{ of } II = 1116 - 924 = 192$$

$$1\% = 48$$

then

$$100\% = ₹ 4800$$

$$\text{Hence the part lent out at } 11\% = ₹ 3600$$

$$\text{and the part lent out at } 15\% = ₹ 4800$$

74. (c) Loss occurred in three years = 720

Loss occurred in one year

$$= \frac{720}{3} = 240$$

$$\Rightarrow 4\% \rightarrow 240$$

$$100\% \rightarrow \frac{240}{4} \times 100 = 6000$$

$$\text{Hence the amount} = ₹ 6000$$

75. (d) According to the question,

$$I \times \frac{8 \times 3}{100} = II \times \frac{9 \times 2}{100}$$

$$\frac{I}{II} = \frac{3}{4}$$

Hence first part I

$$= \frac{3}{(3+4)} \times 21140 = 9060$$

second part II

$$= \frac{3}{(3+4)} \times 21140 = 12080$$

76. (c) Let 18600 be divided into three parts that are x, y, z

at 10% simple interest,

in 2 years 'x' will be amounted

$$\text{to } \frac{120x}{100}$$

in 4 years 'y' will be amounted

$$\text{to } \frac{140y}{100}$$

in 5 years 'z' will be amounted

$$\text{to } \frac{150z}{100}$$

Now according to the question,

$$\frac{120x}{100} = \frac{140y}{100} = \frac{150z}{100}$$

$$\text{or, } 12x = 14y = 15z$$

$$\text{or, } x : y : z = 14 \times 15 : 12 \times 15 : 12 \times 14$$

$$\therefore x : y : z = 35 : 30 : 28$$

$$\therefore x = \frac{18600}{93} \times 35 = \mathbf{7000}$$

$$y = \frac{18600}{93} \times 30 = \mathbf{6000}$$

$$z = \frac{18600}{93} \times 28 = \mathbf{5600}$$

77. (d) Total interest received

$$= \frac{12 \times 3x}{100} + \frac{12 \times 2 \times x}{100} + \frac{12 \times x \times 1}{100}$$

$$= \frac{36x + 24x + 12x}{100} = \frac{72x}{100}$$

Total amount in his account

$$\text{after three years} = \frac{72x}{100} + 3x$$

$$\text{But } \frac{372x}{100} \rightarrow 23808$$

$$x \rightarrow \frac{100}{372} \times 23808 = ₹ 6400$$

Hence he deposits = ₹ 6400 each year

78. (b) By question,

$$\frac{I \times \frac{6 \times 4}{100}}{II \times \frac{5 \times 3}{100}} = \frac{16}{15}$$

$$\frac{I}{II} = \frac{16 \times 5}{15 \times 8} = \frac{2}{3}$$

Hence the amount of first part I

$$= \frac{2}{5} \times 1500 = ₹ 600$$

79. (c) Let the remaining amount be ₹ x.

Then by question

$$x + \frac{x \times 6 \times 5}{100 \times 2} = 12650$$

$$\frac{23}{20}x = 12650$$

$$x = 11000$$

Hence the cost of the article = 6000 + 11000

$$= ₹ 17000$$

80. (b) Interest received by praveen

$$= \left(\frac{2}{5} \times 4 + \frac{1}{3} \times 5 + \frac{4}{15} \times 10 \right) \% = \frac{89}{15} \%$$

$$\text{But } \frac{89}{15} \% \rightarrow 267$$

$$100\% \rightarrow \frac{15}{89} \times 267 \times 100 = 4500$$

Hence the amount lent out by praveen = ₹ 4500

81. (b) Let the initial amount be x.

Then by question.

$$\frac{x \times 5 \times 2}{100} = \frac{(x + 4000) \times 4 \times 2}{100}$$

$$10x = 8x + 32000$$

$$2x = 32000$$

$$x = 16000$$

Hence the initial amount

$$= ₹ 16000$$

82. (c) The interest received

$$= \left(\frac{2}{5} \times 15 + \frac{3}{10} \times 10 + \frac{3}{10} \times 18 \right) \% = 14.4\%$$

Hence effective single annual rate of interest on the whole amount = 14.4%

83. (c) Let the rate of interest be $r\%$
Total interest in 5 years

$$= \frac{12000 \times 3 \times r}{100} + \frac{5500 \times 2 \times r}{100}$$

$$(\because 12000 - 6500 = 5500)$$

$$= 360r + 110r = 470r$$

Total interest paid

$$= 9260 - 5500 = 3760$$

Hence $470r = 3760$

$$r = 8\%$$

84. (c) Let the price of the article for cash payer be 100 units then the price for those taking it on loan

$$= 100 + \frac{100}{100} \times \frac{25}{4} \times \frac{1}{2}$$

$$= \left(100 + \frac{25}{8}\right) = \frac{825}{8}$$

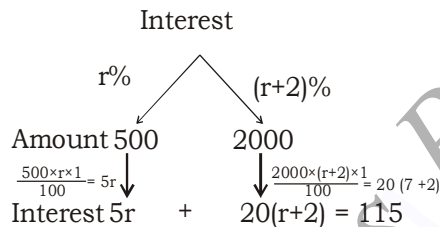
Hence the required ratio

$$= 100 : \frac{825}{8}$$

$$= 800 : 825 = 32 : 33$$

85. (d) Interest of one year

$$= \frac{345}{3} = ₹115$$



$$\Rightarrow 5r + 20r + 40 = 115$$

$$\Rightarrow 25r = 75$$

$$r = 3\%$$

Hence the rate at which praveen lent money to Q $(r + 2) = (3 + 2)\% = 5\%$

86. (c) By question

$$5 \times 6\% - 4 \times 7\% = 248$$

$$30\% - 28\% = 248$$

$$\Rightarrow 2\% \rightarrow 248$$

$$1\% \rightarrow 124$$

$$100\% \rightarrow 12400$$

Hence the amount = 12400

Now the required simple

$$\text{interest} = 3 \times 3\% = 9\%$$

$$= 124 \times 9$$

$$= ₹1116$$

87. (a) Interest of 4 years

$$= \frac{1500}{3} = ₹500$$

Since the principal amount is increased by 10% and 25% after 4 years and hence the interest will also increase in the same proportion.

Hence the total interest of 12 years

$$= 500 + 500 \times \frac{110}{100} + 500 \times \frac{125}{100}$$

$$= 500 + 550 + 625 = ₹1675$$

88. (d) By question,

$$A \times \frac{11}{2} \times \frac{t}{100} = B \times \frac{15}{2} \times \frac{t}{100}$$

$$\frac{A}{B} = \frac{15}{11}$$

Hence money deposited in bank B

$$= \frac{11}{(11+15)} \times 2600 = 1100$$

89. (c) Simple interest received earlier

$$= \frac{p \times r \times t}{100} = ₹480$$

Simple interest received now

$$= \frac{120}{100} \times p \times \frac{5}{3} \times \frac{2}{3} \times \frac{1}{100}$$

$$= \frac{6}{5} \times \frac{5}{3} \times \frac{2}{3} \times \frac{p \times r \times t}{100}$$

$$= ₹640$$

90. (a) Since it becomes 5 time hence the interest received at 6% per annum

$$= r \times t\% = 400\%$$

$$6 \times t = 400\%$$

$$\Rightarrow t = \frac{200}{3} \text{ years}$$

Interest received when the rate of interest becomes 9%

$$= 9 \times \frac{200}{3} \% = 600\%$$

Hence the money would become 7 times of itself.

91. (d) Let first part at 8% is A and the other is B

By question,

$$\frac{A \times \frac{8 \times 2}{100}}{B \times \frac{4 \times 3}{100}} = \frac{16}{7}$$

$$\frac{A}{B} = \frac{12}{7}$$

Hence the required part B

$$= \frac{7}{(12+7)} \times 1900 = 700$$

92. (b) Let the remaining amount be x.

Then

$$x + \frac{x \times 12 \frac{1}{2} \times 3}{100} = 23375$$

$$\frac{275}{200}x = 23375$$

$$x = 17000$$

Hence the total cost of scooter =

$$9000 + 17000 = 26000.$$

93. (a) According to question

$$4 \times 30\% - 100\% = 120$$

$$20\% \rightarrow 120$$

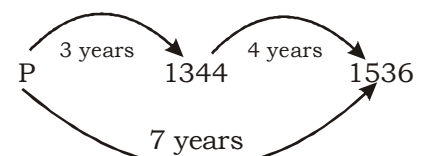
$$1\% \rightarrow 6$$

$$100\% \rightarrow 600$$

Hence the required amount = ₹600

94. (c) Let the principal = Rs. P

According to the question,



4 years simple interest

$$= (1536 - 1344) = \text{Rs.} 192$$

1 year simple interest =

$$\frac{192}{4} = \text{Rs.} 48$$

3 years simple interest =

$$48 \times 3 = \text{Rs.} 144$$

Principal = Amount - simple interest

$$\text{Principal} = 1344 - 144 = \text{Rs.} 1200$$

$$95. (c) \text{ Principal} = \frac{15900}{(100+6)} \times 100$$

$$= \frac{15900}{106} \times 100 = \text{Rs. } 15000$$

Alternatively

You can also solve it from options.

option (c) Principal = Rs. 15000

Rate of interest = 6%

$$\text{Amount} = 15000 + \frac{15000 \times 6}{100}$$

$$\text{Amount} = 15000 + 900$$

Hence option (c) is correct because it satisfies the question condition.

96. (c) Let the principal = P

∴ Simple interest (SI)

$$= 3P - P = 2P$$

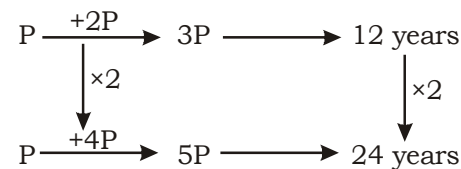
$$2P = \frac{P \times R \times 12}{100} \Rightarrow R = \frac{50}{3} \%$$

Now according to the question,

$$4P = \frac{P \times 50 \times T}{3 \times 100} \Rightarrow T = 24 \text{ years}$$

Alternatively

Note: In such type of questions try to follow the given below method to save your valuable time.



97. (d) SI = Rs. 6300

$$\text{Principal} = \frac{6300 \times 2 \times 100}{7 \times 15}$$

$$= \text{Rs. } 12000$$

Required principal amount

$$= \text{Rs. } 12000$$

98. (b) Let the initial rate = r %

new rate = (r + 4) %

According to the question,

$$\frac{p \times (r+4) \times 2}{100} - \frac{p \times r \times 2}{100} = 112$$

$$p(r+4-r) = 5600$$

$$p = \text{Rs. } 1400$$

Alternatively

Note: To save your valuable time in such type of questions follow the given below method:

Increment in rate% in 2 years = $4 \times 2 = 8\%$

$$\therefore 8\% \text{ of sum} = 112$$

$$1\% \text{ of sum} = \frac{112}{8}$$

$$100\% \text{ of sum} = \frac{112}{8} \times 100$$

$$= \text{Rs. } 1400$$

$$\text{Required sum} = \text{Rs. } 1400$$

99. (b) Let the principal = p

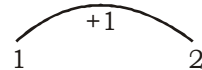
$$\therefore \text{Amount} = 2p$$

$$\text{Simple interest} = 2p - p = p$$

$$p = \frac{p \times 20 \times t}{100} \Rightarrow T = 5 \text{ years}$$

Alternatively

Let principal = Rs. 1



$$\text{Time} = \frac{1}{1} \times \frac{100}{20} \Rightarrow 5 \text{ years}$$

100. (b) Let the principal = Rs. P

∴ Amount = Rs. 3P

$$\text{Simple interest} = (3P - P) = 2P$$

$$r = \frac{2P}{P} \times \frac{100}{15} = \frac{40}{3} \%$$

$$= 13.33\%$$

101. (c) Let the sum is P_1 and P_2 respectively.

According to the question,

$$\frac{P_1 \times 5 \times 2}{100} = \frac{P_2 \times 10 \times 4}{100}$$

$$\frac{P_1}{P_2} = \frac{4}{1} \Rightarrow P_1 : P_2 = 4 : 1$$

$$(4 + 1) \text{ units} = 625$$

$$1 \text{ unit} = 125$$

$$4 \text{ units} = 125 \times 4 = 500$$

$$\text{first part } (P_1) = \text{Rs. } 500$$

$$\text{Second part } (P_2) = \text{Rs. } 125$$

Alternate

Note: We can also solve it from options.

Option (c)

$$\text{Second part} = \text{Rs. } 125$$

$$\text{First part} = (625 - 125) = \text{Rs. } 500$$

According to the question,

$$\frac{500 \times 5 \times 2}{100} = \frac{125 \times 10 \times 4}{100}$$

$$50 = 50$$

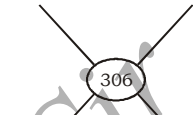
Both sides are equal hence, option (c) is correct.

102. (d) sum = Rs. 2500

average rate of interest

$$= \frac{306}{2500} \times 100 = \frac{306}{25} \%$$

$$\begin{array}{l} \text{I}^{\text{st}} \text{ part} \\ 12\% \text{ of } 2500 \\ 300 \end{array} \quad \begin{array}{l} \text{II}^{\text{nd}} \text{ part} \\ 12.5\% \text{ of } 2500 \\ 312.5 \end{array}$$



$$\text{Ratio of sums} \rightarrow \frac{6.5}{13} : \frac{6}{12}$$

$$(13 + 12) \text{ units} = \text{Rs. } 2500$$

$$1 \text{ unit} = \text{Rs. } 100$$

$$13 \text{ units} = \text{Rs. } 1300$$

$$\text{Money lent at } 12\% = \text{Rs. } 1300$$

103. (d) Let rate of interest = r %

According to the question,

$$\frac{6000 \times r \times 2}{100} + \frac{1500 \times r \times 4}{100}$$

$$= 900$$

$$120r + 60r = 900$$

$$180r = 900$$

$$r = 5\%$$

104. (c) Amount due after first year

$$= 200 + \frac{200 \times 5 \times 1}{100} = \text{Rs. } 210$$

According to the question,

Bhuvnesh paid Rs. 100 at the end of 1 year

Remaining amount

$$= (210 - 100) = \text{Rs. } 110$$

Amount paid in second year

$$= 110 + \frac{110 \times 1 \times 5}{100}$$

$$= 110 + 5.5 = \text{Rs. } 115.5$$

105. (b) Let the share of each daughter be P_1 , P_2 and P_3 respectively.

∴ According to the question,

$$\frac{P_1 \times 2 \times 5}{100} = \frac{P_2 \times 3 \times 5}{100}$$

$$= \frac{P_3 \times 5 \times 4}{100}$$

$$\text{Ratio of } P_1 : P_2 : P_3 = 6 : 4 : 3 =$$

$$\frac{1}{10} : \frac{1}{15} : \frac{1}{20}$$

106.(b) **Note** : In such type of questions try to understand the below given method to save your valuable time.

Annual payment =

$$\frac{\text{Debt} \times 100}{100 \times t + ((t-1) + (t-2) + (t-3) + \dots) \times r}$$

$$\text{Annual payment} = \frac{580 \times 100}{5 \times 100 + (4 + 3 + 2 + 1) \times 8}$$

$$= \frac{580 \times 100}{580}$$

$$= \text{Rs. } 100$$

107.(a) $12\frac{1}{2}\% = \frac{1 \rightarrow \text{SI}}{8 \rightarrow \text{principal}}$

Let principal = 8 units

SI for 3 years = $1 \times 3 = 3$ units

Difference = $(8 - 3) = 5$ units

According to the question,

5 units = Rs. 3500

1 unit = Rs. 700

principal = 8 units = 8×700

= Rs. 5600

108.(a) $5\% = \frac{1 \rightarrow \text{SI}}{20 \rightarrow \text{principal}}$

Let principal = 20 units

SI = 1 unit

SI for 7 years = $1 \times 7 = 7$ units

Difference = $(20 - 7) = 13$ units

According to the question,

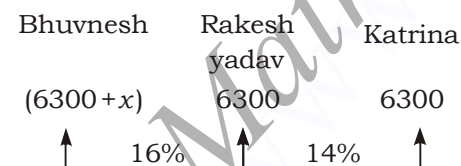
13 units = Rs. 1300

1 unit = Rs. 100

20 units = $20 \times 100 = \text{Rs. } 2000$

Principal = Rs. 2000

109.(a)



According to the question,
Rakesh yadav earns 618 in 3 years
Rakesh yadav earns in 1 year =

$$\frac{618}{3} = \text{Rs. } 206$$

But his increased amount due to increased rate

$$= \frac{6300 \times 2 \times 1}{100} = \text{Rs. } 126$$

$$\text{More amount} = (206 - 126) = \text{Rs. } 80$$

Note: Rakesh yadav earns Rs.80 on adding amount

$$\therefore \frac{x \times 16 \times 1}{100} = 80$$

$$\Rightarrow x = \text{Rs. } 500$$

$\therefore$ Hence amount add by Rakesh yadav = Rs.500

Alternatively

Note: To save your valuable time you can take help from options.

Option (a)

Adding amount = Rs. 500

Total amount = $(6300 + 500) = \text{Rs. } 6800$

According to the question,

$$6800 \times \frac{16}{100} - 6300 \times \frac{14}{100}$$

$$= 206 \left[\therefore \frac{618}{3} = 206 \right]$$

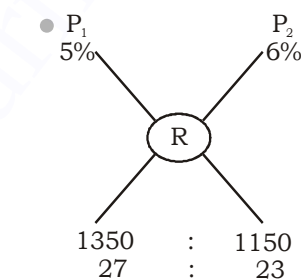
$$1088 - 882 = 206$$

$$206 = 206$$

Both sides are equal, hence option (a) is correct.

110.(a) **Note:** To save your valuable time try to solve this question by allegation method.

Let the rate of interest = R%



$$R = \frac{27 \times 5 + 23 \times 6}{27 + 23}$$

$$= \frac{138 + 135}{50} = \frac{273}{50} = 5.46\%$$

111.(a) Let the principle = 100 units

Simple interest for first 4 years

$$= \frac{100 \times 4 \times 8}{100}$$

$$= 32 \text{ units}$$

Simple interest for next 6 years

$$= 60 \text{ units}$$

Simple interest for next 5 years = 60 units

Total SI = $32 + 60 + 60$

$$= 152 \text{ units}$$

According to the question,

$$1 \text{ unit} = \frac{12160}{152} = \text{Rs. } 80$$

$$100 \text{ units} = 80 \times 100$$

$$= \text{Rs. } 8000$$

Required principal = Rs. 8000

112.(c) Let the principal = 6 units

$$\therefore \text{Amount} = 6 \times \frac{7}{6} = 7 \text{ units}$$

$$\therefore \text{Interest} = (7 - 6) = 1 \text{ unit}$$

$$\text{Rate of interest} = \frac{1}{6} \times \frac{100}{3} = \frac{50}{9} = 5\frac{5}{9}\%$$

113.(c) Let rate of interest = 1%

$$\text{SI for Rs. } 400 = \frac{400 \times 2 \times 1}{100} = \text{Rs. } 8$$

$$\text{SI for Rs. } 550 = \frac{550 \times 4 \times 1}{100} = \text{Rs. } 22$$

$$\text{SI for Rs. } 1200 = \frac{1200 \times 6 \times 1}{100} = \text{Rs. } 72$$

Total SI = $(8 + 22 + 72) = \text{Rs. } 102$

102 units = Rs. 1020

1 unit = Rs. 10

$\therefore$ Rate of interest = $1 \times 10 = 10\%$

114.(b) Total interest paid by Rakesh yadav = $(5450 + 3000) - 7000 = \text{Rs. } 1450$

Let rate of interest = r %

Now according to the question,

$$\frac{7000 \times r \times 3}{100} + \frac{4000 \times r \times 2}{100}$$

$$= \text{Rs. } 1450$$

$$210r + 80r = 1450$$

$$290r = 1450$$

$$r = 5\%$$

115.(a) **Note** : To save your valuable time follow the given below follow :

Value of installment =

$$\frac{\text{Debt}}{\text{No. of installment} + (\text{Time}) \times \text{rate}\%}$$

$$= \frac{944}{4 + (3 + 2 + 1) \times \frac{12}{100}}$$

$$= \frac{944}{4 + \frac{72}{100}} = \frac{944 \times 100}{472}$$

$$= \text{Rs. 200}$$

116. (a) Installment

$$= \frac{848 \times 100}{100 \times 4 + (3 + 2 + 1) \times 4}$$

$$= \frac{848 \times 100}{400 + 24} = \frac{848 \times 100}{424}$$

$$= \text{Rs. 200}$$

117. (a) Let the money invested by the man = 100 units

Principal	SI
for 3 yrs $\rightarrow 100$	$\frac{100 \times 3 \times 11}{100} = 33$
for 2 yrs $\rightarrow 100$	$\frac{100 \times 2 \times 11}{100} = 22$
for 1 yr $\rightarrow 100$	$\frac{100 \times 1 \times 11}{100} = 11$

300 units 66 units
According to the question,
366 units = Rs. 30012

$$1 \text{ unit} = \frac{30012}{366} = 82$$

Principal = $82 \times 100 = \text{Rs. 8200}$

118. (b) Rate of interest = 5% (given)
Let the amount received by younger son and elder son is Y and E respectively.

According to the question,

$$\frac{Y \times (100 + 6 \times 5)}{100}$$

$$= \frac{E \times (100 + 5 \times 4)}{100}$$

$$130 Y = 120 E$$

$$\frac{Y}{E} = \frac{12}{13}$$

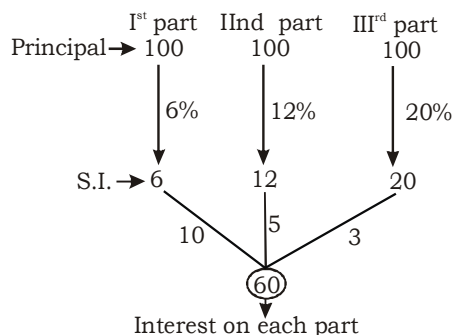
$$Y : E = 12 : 13$$

$$25 \text{ units} = \text{Rs. 18750}$$

$$12 \text{ units} = \frac{18750}{25} \times 12 = \text{Rs. 9000}$$

Hence share of younger son Y =
Rs. 9000

119. (c) Let principle for each part = 100 units

 $\therefore$ Ratio of principal

$$\text{Ist part} : \text{IInd part} : \text{IIIrd part}$$

$$100 \times 10 : 100 \times 5 : 100 \times 3$$

$$1000 : 500 : 300$$

$$\text{Total sum} = (1000 + 500 + 300)$$

$$= 1800 \text{ units}$$

$$60 \text{ units} = \text{Rs. 420}$$

$$1 \text{ unit} = \text{Rs. 7}$$

$$1800 \text{ units} = 1800 \times 7$$

$$= \text{Rs. 12,600}$$

120. (c) Difference in rate =

$$\left(8 - 7\frac{3}{4}\right)\% = \frac{1}{4}\%$$

Let the capital be Rs. x

$$\therefore \frac{1}{4}\% \text{ of } x = 61.25$$

$$\Rightarrow x = 61.25 \times 4 \times 100$$

$$= \text{Rs. 24600}$$

121. (d) Let the sum = Rs. 600

Note: We try to assume such types of values which can avoid fractions and make our calculation easier.

Case - I :

$$\text{S.I.} = \frac{600 \times 4 \times 8}{12 \times 100} = \text{Rs. 16}$$

Case - II :

$$\text{S.I.} = \frac{600 \times 5 \times 15}{12 \times 100} = \text{Rs. 37.5}$$

$$\therefore \text{Difference} = 37.5 - 16$$

$$= 21.5$$

$$\text{but, the given difference} = \text{Rs. 129}$$

$$\text{i.e. } 21.5 \longrightarrow 129$$

$$\Rightarrow 1 \longrightarrow \frac{129}{21.5} = 6$$

$$\Rightarrow 600 \longrightarrow 6 \times 600 = 3600$$

i.e. the required sum = Rs. 3600

$$122. (c) \text{ a) } \frac{41}{40} \rightarrow (A)$$

$$\frac{40}{40} \rightarrow (P)$$

$$\Rightarrow \text{Simple Interest} = 41 - 40$$

$$= ₹ 1$$

$$\therefore \text{Rate} = \frac{\text{S.I.} \times 100}{P \times T}$$

$$= \frac{1 \times 100}{40 \times 1/4} = 10\%$$

123. (a) Difference in %

$$= \left(12\frac{1}{2} - 10\right)\% = 2.5\%$$

Let his principal = Rs. x

$\therefore$ According to the question,
2.5 % of x = Rs. 1250

$$\Rightarrow x = \frac{1250 \times 100}{2.5}$$

$$= \text{Rs. 50,000}$$

124. (d) S.I. = Rs. 1, Rate = 5 %,

$$T = 1 \text{ day} = \frac{1}{365} \text{ year}$$

P = ?

$$\therefore P = \frac{\text{S.I.} \times 100}{RT} = \frac{1 \times 100}{5 \times 1} \times 365$$

$$= \text{Rs. 7300}$$

125. (a) Given, P = Rs. 7300, R = 5 %

T = From 11 May to 10
september 1987

$$= 21 + 30 + 31 + 31 + 10$$

$$= 23 \text{ days} = \frac{23}{365} \text{ years}$$

$$\therefore \text{S.I.} = \frac{7300 \times 23 \times 5}{365 \times 100} = \text{Rs. 123}$$

126. (d) Let the sum lent to C be Rs. x

According to the question,

$$\frac{2500 \times 7 \times 4}{100} + \frac{x \times 7 \times 4}{100} = 1120$$

$$\text{or } 2500 + x = 4000$$

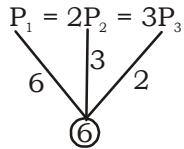
$$\Rightarrow x = \text{Rs. 1500}$$

- 127.(a) Let the amount invested by the person in three schemes is P_1 , P_2 and P_3 respectively

According to the question,

$$\frac{P_1 \times 6 \times 10}{100} = \frac{P_2 \times 10 \times 12}{100} = \frac{P_3 \times 12 \times 15}{100}$$

$$P_1 = 2P_2 = 3P_3$$



$$\therefore P_1 : P_2 : P_3 = 6 : 3 : 2$$

Alternatively

$$\text{Required Ratio} = P_1 : P_2 : P_3$$

$$= \frac{1}{r_1 t_1} : \frac{1}{r_2 t_2} : \frac{1}{r_3 t_3}$$

$$= \frac{1}{6 \times 10} : \frac{1}{10 \times 12} : \frac{1}{12 \times 15}$$

$$= \frac{1}{60} : \frac{1}{120} : \frac{1}{180} = 6 : 3 : 2$$

- 128.(c) Principal : Amount = 4 : 5

After 3 years,

$$\text{Principal : Amount} = 5 : 7$$

$\therefore$ Principal will remain same,

So, multiply (i) $\times 5$ & (ii) $\times 4$, we get

$$P : A = 20 : 25$$

After 3 years,

$$P : A = 20 : 28$$

i.e. S.I. in 3 years = $28 - 25 = 3$

$$\therefore \text{S.I. in 1 year} = \frac{3}{3} = 1$$

$$\therefore \text{Rate \% p.a.} = \frac{1}{20} \times 100 = 5 \%$$

- 129.(d) After 10 years,

$$\text{SI} = \frac{1000 \times 5 \times 10}{100} = \text{Rs. } 500$$

$$\begin{aligned} \text{Principal for 11 th year and next} \\ = 1000 + 500 = \text{Rs. } 1500 \end{aligned}$$

$$\text{SI} = \text{Rs. } (2000 - 1500) = \text{Rs. } 500$$

$$\therefore T = \frac{\text{SI} \times 100}{P \times R} = \frac{500 \times 100}{1500 \times 5}$$

$$= \frac{20}{3} \text{ years} = 6 \frac{2}{3} \text{ years}$$

$$\begin{aligned} \therefore \text{Total time} &= 10 + 6 \frac{2}{3} \\ &= 16 \frac{2}{3} \text{ years} \end{aligned}$$

- 130.(c) Let the period of time be T years.

According to the question,

$$\therefore 800 + \frac{800 \times 12 \times T}{100}$$

$$= 900 + \frac{910 \times 10 \times T}{100}$$

$$\Rightarrow 800 + 96 T = 910 + 91 T$$

$$\Rightarrow 96 T - 91 T = 910 - 800$$

$$\Rightarrow T = \frac{110}{5} = 22 \text{ years}$$

Alternatively

Difference of sum =

$$910 - 800 = \text{Rs. } 110$$

$$12 \% \text{ of } 800 = \text{Rs. } 96 \quad \& \quad 10 \% \text{ of } 910 = \text{Rs. } 91 \quad \textcircled{5}$$

i.e. 5 rupees difference is covered in 1 year

$\therefore$ 110 Rupees difference will be

$$\text{covered in } \frac{1}{5} \times 110$$

$$= 22 \text{ years}$$

- 131.(c) S.I. earned after 2 years

$$= \frac{15600 \times 10 \times 2}{100}$$

$$= \text{Rs. } 3120$$

$\therefore$ Principal for next 2 years

$$= \text{Rs. } (15600 + 3120)$$

$$= \text{Rs. } 18720$$

$\therefore$ S.I. earned for next 2 years

$$= \frac{18720 \times 10 \times 2}{100} = 3744$$

$\therefore$ S.I. earned at the end of fourth year = $3120 + 3744$

$$= \text{Rs. } 6864$$

- 132.(c) S.I. on Rs. 8000 = $\frac{11}{2} \%$ of

$$8000 = 440$$

$$\text{S.I. on Rs. } 24000 = 6 \% \text{ of } 24000 = 1440$$

$$\text{Remaining amount} = 50,000 - 8000 - 24000 = \text{Rs. } 18000$$

$\therefore$ S.I. on Rs. 18000 = Rs. $[3680 - (440 + 1440)] = \text{Rs. } 1800$

$\therefore$ Required rate

$$= \frac{1800}{18000} \times 100 = 10 \%$$

- 133.(b) S.I. after 5 years = $\frac{PRT}{100}$

$$= \frac{12000 \times 10 \times 5}{100} = \text{Rs. } 6000$$

$$\begin{aligned} \text{Interest earned} &= \text{Rs. } (6000 - 3320) \\ &= \text{Rs. } 2680 \end{aligned}$$

$$\therefore \text{Rate} = \frac{\text{S.I.} \times 100}{\text{PT}}$$

$$= \frac{2680 \times 100}{12000 \times 3} = \frac{67}{9} = 7\frac{4}{9}\%$$

134. (d) Let principle = P

$$\therefore \text{Amount} = 3P$$

$$\text{SI} = 3P - P = 2P$$

Rate of interest

$$= \frac{2P}{P} \times \frac{100}{8} = 25\%$$

Now According to the question,

$$\text{required time} = \frac{P}{4} = \frac{P \times 25 \times t}{100}$$

$$t = 1 \text{ year}$$

135. (a) Amount at 7% = Rs 450

Amount at 5% = Rs 350

$$\begin{aligned} \text{Difference in rates} &= (7 - 5)\% \\ &= 2\% \end{aligned}$$

$$\begin{aligned} \text{Difference in amount} &= (450 - 350) = \text{Rs } 100 \end{aligned}$$

$$2\% \text{ of SI} = \text{Rs } 100$$

$$1\% \text{ of SI} = \text{Rs } 50$$

$$7\% \text{ of SI} = \text{Rs } 350$$

$$\text{principal} = 450 - 350 = \text{Rs } 100$$

$$\text{Time} = \frac{350}{100} \times \frac{100}{7} = 50 \text{ years}$$

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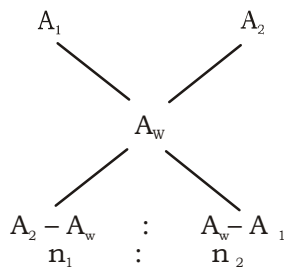
MIXTURE AND ALLIGATION

- ♦ **Rule of Alligation :** Two groups of elements are mixed together to form a third group containing the elements of both groups.

If the average of the first group is A_1 and the number of element is n_1 and the average of the second group is A_2 and the number of elements is n_2 , then to find the average of the new group formed, we can use either the weighted average equation or the alligation equation.

As a convenient convention, we take $A_1 < A_2$. Then by the principle of averages, we get $A_1 < A_w < A_2$.

- ♦ **Graphical Representation of Alligation:**



Or, it can be explained as follows :-

Let the two ingredients be mixed. Then,

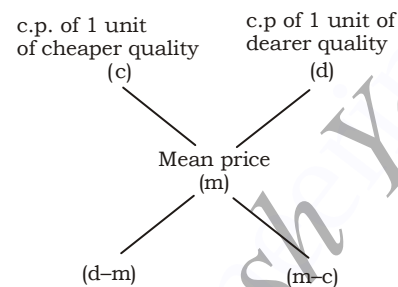
Some useful shortcut Methods :

- (1) From a container having x units of a liquid, suppose y units are taken out and replaced by water.

After n operations, quantity of pure liquid

$$= \left[x \left(1 - \frac{y}{c} \right)^n \right] \text{ units}$$

$c \Rightarrow$ capacity of container



$$\frac{\text{Quantity of cheaper quality}}{\text{Quantity of dearer quality}} = \frac{d - m}{m - c}$$

- (2) There are n vessels of equal size filled with mixtures of liquids A and B in the ratio $a_1 : b_1, a_2 : b_2, \dots, a_n : b_n$ respectively. If the contents of all the vessels are poured into a single vessel, then

Quantity of liquid A

Quantity of liquid B

$$= \frac{\left(\frac{a_1}{a_1 + b_1} + \frac{a_2}{a_2 + b_2} + \dots + \frac{a_n}{a_n + b_n} \right)}{\left(\frac{b_1}{a_1 + b_1} + \frac{b_2}{a_2 + b_2} + \dots + \frac{b_n}{a_n + b_n} \right)}$$

- (3) There are n vessels of sizes $c_1, c_2, \dots, c_n$ filled with mixtures of liquids A and B in the ratio $a_1 : b_1, a_2 : b_2, \dots, a_n : b_n$ respectively. If the contents of all the vessels are poured into a single large vessel, then

Quantity of liquid A

Quantity of liquid B

$$= \frac{\left(\frac{a_1 c_1}{a_1 + b_1} + \frac{a_2 c_2}{a_2 + b_2} + \dots + \frac{a_n c_n}{a_n + b_n} \right)}{\left(\frac{b_1 c_1}{a_1 + b_1} + \frac{b_2 c_2}{a_2 + b_2} + \dots + \frac{b_n c_n}{a_n + b_n} \right)}$$

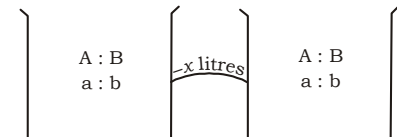
- (4) If a vessel contains 'a' litres of liquid A and if 'b' litres be withdrawn and replaced by liquid B, then if 'b' litres of mixture be withdrawn and replaced by liquid B, and the operation is repeated 'n' times in all, then

$$\frac{\text{Liquid A left after } n^{\text{th}} \text{ operation}}{\text{Liquid B left after } n^{\text{th}} \text{ operation}} = \frac{\left(\frac{a-b}{a} \right)^n}{1 - \left(\frac{a-b}{a} \right)^n}$$

- (5) A vessel, full of liquid A, contains 'a' litres of it of which several litres are withdrawn. The vessel is then filled with liquid B. Next the same volume of the mixture withdrawn and again the vessel is filled with liquid B. This process is repeated n times. As result, the vessel contains 'b' litres of liquid A, then

$$\frac{\text{Final quantity of liquid A}}{\text{Initial quantity of liquid A}} = \sqrt[n]{\frac{b}{a}}$$

Note : If a vessel contains liquid A and liquid B in the ratio $a : b$ and if some quantity of the mixture (or vessel) are withdrawn, then if the remaining mixture, liquid A and liquid B will be in the ratio $a : b$ i.e. ratio will not change.





EXAMPLE

1. 20 Litres of a mixture contains milk and water in the ratio 3 : 1. Then the amount of milk to be added to the mixture so as to have milk and water in ratio 4 : 1 is

(a) 6 L (b) 5 L
(c) 7 L (d) 4 L

Sol. (B) In 20 L of mixture

$$\text{milk} = \frac{3}{4} \times 20 = 15 \text{ L}$$

$$\text{water} = \frac{1}{4} \times 20 = 5 \text{ L}$$

Let the quantity of milk added be y litres

$$\text{A.T.Q. } \frac{15+y}{5} = \frac{4}{1}$$

$$\Rightarrow 15+y = 4 \times 5$$

$$y = 20 - 15 = 5 \text{ litres}$$

Alternate:-

Milk Water

$$1 \left(\begin{array}{cc} 3 & 1 \\ 4 & 1 \end{array} \right) \xrightarrow{\times 5} 20$$

4 Units = 20
1 Unit = 5 lit.

2. A mixture contains milk and water in the ratio 5 : 1. On adding 5 litres of water the ratio of milk and water becomes 5 : 2. The quantity of milk in the mixture is

(a) 22.75 L (b) 32.5 L
(c) 16 L (d) 25 L

Sol. (d) Quantity of milk in mixture = $5x$

Quantity of water = x L

A.T.Q., on adding 5 L of water

$$\frac{5x}{x+5} = \frac{5}{2} \Rightarrow 10x = 5x + 25$$

$$5x = 25$$

$$x = 5$$

$\therefore$ Required answer = $5 \times 5 = 25 \text{ L}$

Alternate:-

Milk Water

$$1 \left(\begin{array}{cc} 5 & 1 \\ 5 & 2 \end{array} \right) \xrightarrow{\times 5} 5$$

1 Unit = 5
 $\therefore$ 5 Units = 25 Litres

3. 80 Litres of a mixture contains milk and water in the ratio of 27 : 5. How much more water is to be added to get a mixture containing milk and water in the ratio of 3 : 1?

(a) 20 L (b) 10 L
(c) 12 L (d) 15 L

Sol. (B)

$$\begin{array}{ccc} \text{Milk} & : & \text{Water} \\ 27 & : & 5 \end{array} \xrightarrow{\times \frac{5}{2}} \begin{array}{ccc} & & 80 \\ & +4 & \\ 3 \times 9 & : & 1 \times 9 \end{array} \xrightarrow{\times \frac{5}{2}} \begin{array}{ccc} & & 32 \\ & +4 & \\ 15 & : & 10 \end{array}$$

4. Zinc and Copper are in the ratio 5 : 3 in 200 gm of an alloy, How much grams of copper be added to make the ratio 3 : 5?

(a) 66 (b) 72

(c) $\frac{1}{200}$ (d) $133\frac{1}{3}$

Sol. (D)

$$\begin{array}{ccc} \text{Zinc} & : & \text{Copper} \\ 5 \times 3 & : & 3 \times 3 \end{array} \xrightarrow{\times \frac{25}{3}} \begin{array}{ccc} & & 200 \\ & +16 & \\ 15 & : & 9 \end{array} \xrightarrow{\times \frac{25}{3}} \begin{array}{ccc} & & 400 \\ & +16 & \\ 15 & : & 25 \end{array} \xrightarrow{\times \frac{25}{3}} \frac{400}{3} = 133\frac{1}{3}$$

5. An alloy contains Copper Zinc and Nickel in the ratio of 5 : 3 : 2. The quantity of Nickel that must be added to 100 kg of this alloy to have the new ratio 5 : 3 : 3 is

(a) 8 kg (b) 16 kg
(c) 12 kg (d) 10 kg

Sol. (d)

$$\begin{array}{ccc} \text{Copper} & : & \text{Zinc} & : & \text{Nickel} \\ \text{Old} & 5 & : & 3 & : & 2 \end{array} \xrightarrow{+1 \text{ unit}} \begin{array}{ccc} \text{New} & 5 & : & 3 & : & 3 \end{array}$$

Now old ratio = $5x + 3x + 2x = 10x$
 $10x = 100 \text{ kg}$
 $x = 10 \text{ kg}$

Nickel added to mixture = 10 kg (unit)

6. Two numbers are in the ratio 2:3. If 2 is subtracted from the first and 2 is added to the second. The ratio becomes 1:2. The sum of the numbers is:

(a) 24 (b) 10
(c) 30 (d) 28

Sol. (c) $A : B = 2x : 3x$

$$\text{Now, } \frac{2x-2}{3x+2} = \frac{1}{2}$$

$$4x - 4 = 3x + 2$$

$$x \Rightarrow 6$$

$$\therefore A = 2 \times 6 = 12$$

$$B = 3 \times 6 = 18$$

$$\text{Sum of no.} = A + B = 12 + 18 = 30$$

7. A trader has 40 kg of rice, a part of which he sells at 28%. Profit and rest at 12% loss. on the whole his loss is 8%. What is the quantity sold at 28% profit and that at 12% loss?

Sol.

$$\begin{array}{ccc} \text{Rice}_1 & & \text{Rice}_2 \\ 28\% & & -12\% \\ & \searrow & \swarrow \\ & -8\% & \\ & \swarrow & \searrow \\ 4 & : & 36 \\ 1 & : & 9 \end{array}$$

$$\therefore 10 \text{ units} = 40 \text{ kg}$$

$$\therefore 1 \text{ unit} = 4 \text{ kg}$$

$$\therefore 9 \text{ units} = 4 \times 9 = 36 \text{ kg}$$

$\therefore$ Quantities sold at 28% profit and 12% loss is 4 kg and 36 kg respectively.

8. Four vessels of equal size contain mixture of spirit and water. The concentration of spirit in 4 vessels is 60%, 70%, 75% and 80% respectively if all four mixtures are mixed, Find in the resultant mixture the ratio of spirit to water?

Sol. Assume each vessels contain 20 L of mixture

$$\begin{array}{cc} 20\text{L} & 20\text{L} \\ \text{S} : \text{W} & \text{S} : \text{W} \\ \begin{array}{cc} 3 & 2 \end{array} & \begin{array}{cc} 7 & 3 \end{array} \\ \downarrow \times 4 & \downarrow \times 2 \\ 12 & 8 \end{array} \quad \begin{array}{cc} \downarrow \times 2 & \downarrow \times 2 \\ 14 & 6 \end{array}$$

$$\begin{array}{cc} 20\text{L} & 20\text{L} \\ \text{S} : \text{W} & \text{S} : \text{W} \\ \begin{array}{cc} 3 & 1 \end{array} & \begin{array}{cc} 4 & 1 \end{array} \\ \downarrow \times 5 & \downarrow \times 5 \\ 15 & 5 \end{array} \quad \begin{array}{cc} \downarrow \times 4 & \downarrow \times 4 \\ 16 & 4 \end{array}$$

Quantity of spirit to water

$$= \frac{12+14+15+16}{8+6+5+4} = \frac{57}{23}$$

$$\therefore \text{Ratio of spirit to water} = 57 : 23$$



9. A -25- litres cylinder contains a mixture of oxygen and nitrogen, the volume of oxygen being 25% of total volume. A few litres of the mixture is released and an equal amount of nitrogen is added. Then the same amount of the mixture as before is released and replaced by nitrogen for the second time. As a result the oxygen content becomes 9% of the total volume. How many litres of mixture is released each time?

Sol. $\frac{\text{Remaining oxygen}}{\text{original oxygen}}$

$$= \left(1 - \frac{\text{Vol. of each time released / added}}{\text{Total vol. of vessel}} \right)$$

$$\Rightarrow \frac{9\%}{25\%} = \left(1 - \frac{x}{25} \right)^2$$

$$\Rightarrow \sqrt{\frac{9}{25}} = 1 - \frac{x}{25}$$

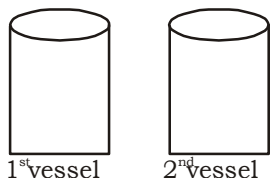
$$\Rightarrow \frac{3}{5} = 1 - \frac{x}{25} \Rightarrow \frac{x}{25} = \frac{2}{5}$$

$$\Rightarrow x = \frac{2}{5} \times 25 = 10 \text{ L}$$

$\therefore$ Amount of mixture released each time = 10 litre.

10. There are two vessels of equal capacity one full of milk and the second one-third full of water. The second vessel is then filled up by the first, the contents of the second are then poured back into the first till it is full and then again the contents of the contents of the first are poured in the second till it is full. What is the proportion of milk in the second vessel?

Sol.



Assuming vol. of the each vessel = 18 L.

1st Case:-

When 12 lit milk is poured in 2nd Vessel

1st vessel	2nd vessel
m	m : w
6	12 : 6

2nd Case:-

When $\frac{2}{3}$ of 2nd vessel is poured in 1st vessel.

$$\text{Milk} = 12 \times \frac{2}{3} = 8 \text{ lit.}$$

$$\text{Water} = 6 \times \frac{2}{3} = 4 \text{ lit.}$$

1st vessel	2nd vessel
M : W	M : W
6 + 8 : 4	4 : 2
= 7 : 2	= 2 : 1

3rd Case:-

When $\frac{2}{3}$ rd of 1st vessel is poured in 2nd vessel

$$\text{Milk} = 7 \times \frac{2}{3} = \frac{14}{3}$$

$$\text{Water} = 2 \times \frac{2}{3} = \frac{4}{3}$$

1st Vessel	2nd Vessel
M : W	M : W
$7 - \frac{14}{3} : 2 - \frac{4}{3}$	$2 + \frac{14}{3} : 1 + \frac{4}{3}$
$\frac{7}{3} : \frac{2}{3}$	$\frac{20}{3} : \frac{7}{3}$

i.e. In 2nd vessel, M : W = 20 : 7

$\therefore$ Proportion of Milk in final mixture = 20 : 20 + 7 = 20 : 27

11. A dishonest hair dresser use a mixture having 5 parts pure after-shave lotion and 3 parts pure water. After taking out some portion of the mixture, he adds equal amount of pure water to the remaining portion of mixture such that the amount of after shave lotion and water becomes equal. Find the part of mixture taken out?

Sol.

Lotion	Water	
5	3	= 8
1×5	1×5	= 10

$$\therefore \text{Mixture taken out} = \frac{2}{10} = \frac{1}{5}$$

12. A vessel is filled with liquid, 3 parts of which are water in 5 parts group. How much of the mixture must be drawn off and replaced with water so that the mixture may be half water and half group?

$$(a) \frac{2}{3} \quad (b) \frac{1}{4}$$

$$(c) \frac{2}{7} \quad (d) \frac{1}{5}$$

Sol. (b)

$$\begin{array}{c} \frac{3}{8} \quad 1 \\ \swarrow \quad \searrow \\ \frac{1}{2} \quad \frac{1}{2} \\ \swarrow \quad \searrow \\ 1 - \frac{1}{2} = \frac{1}{2} \quad \frac{1}{2} - \frac{3}{8} = \frac{1}{8} \end{array}$$

Ratio = 4 : 1

$$\therefore \text{Required quantity} = \frac{1}{4}$$

13. In two alloys A and B, the ratio of zinc to tin is 5 : 2 and 3 : 4 respectively. 7kg of the alloy A and 21 kg of the alloy B are mixed together to form a new alloy. What will be the ratio of zinc and tin in the new alloy?

$$(a) 3 : 1 \quad (b) 3 : 2$$

$$(c) 1 : 1 \quad (d) 2 : 1$$

Sol. (c) In 7kg of alloy A

Ratio of Zinc to tin is 5 : 2

zinc = 5kg, Tin = 2kg

In 21 kg of alloy B

$$\text{zinc} = \frac{21 \times 3}{7} = 9 \text{ kg}$$

$$\text{Tin} = \frac{21 \times 4}{7} = 12 \text{ kg}$$

$\therefore$ Required ratio = (5 + 9) : (2 + 12) = 14 : 14 or 1 : 1

14. Three vessels whose capacities are 3 : 2 : 1 are completely filled with milk mixed with water. The ratio of milk and water in the mixture of vessels are 5 : 2, 4 : 1

and 4 : 1 respectively. Taking $\frac{1}{3}$

of first, $\frac{1}{2}$ of second and $\frac{1}{7}$ of third mixtures, a new mixture kept in a new vessel is prepared. The percentage of water in the new mixture is

$$(a) 30 \quad (b) 32$$

$$(c) 28 \quad (d) 24$$



Sol. (d) Let there be 3 litres, 2 litres and 1 litre of mixtures in three vessels respectively are:

vessel I

In 1 litre of mixture,

$$\text{Milk} = \frac{5}{7} \text{ litre, water} = \frac{2}{7} \text{ litre}$$

Vessel II

In 1 litre of mixture,

$$\text{Milk} = \frac{4}{5} \text{ litre, water} = \frac{1}{5} \text{ litre}$$

Vessel III

In $\frac{1}{7}$ litre of mixture,

$$\text{Milk} = \frac{4}{5} \times \frac{1}{7} = \frac{4}{35} \text{ litre}$$

$$\text{Water} = \frac{1}{35} \text{ litre}$$

In new vessel,

$$\begin{aligned} \text{Mixture} &= 1 + 1 + \frac{1}{7} \\ &= 2 + \frac{1}{7} = \frac{14+1}{7} = \frac{15}{7} \text{ litres} \end{aligned}$$

$$\text{Water} = \frac{2}{7} + \frac{1}{5} + \frac{1}{35} = \frac{10+7+1}{35}$$

$$= \frac{18}{35} \text{ litre}$$

Required percentage

$$\begin{aligned} &= \frac{\frac{18}{35}}{\frac{15}{7}} \times 100 \Rightarrow \frac{18}{35} \times \frac{7}{15} \times 100 \\ &= 24\% \end{aligned}$$

Alternate

M

W

$$V_1 \quad 5_{\times 15}$$

$$2_{\times 15} = 7 \times 5 \times 3$$

$$V_2 \quad 4_{\times 14}$$

$$1_{\times 14} = 5 \times 7 \times 2$$

$$V_3 \quad 4_{\times 7}$$

$$1_{\times 7} = 5 \times 7 \times 1$$

M

W

$$\Rightarrow V_1 \quad 75 \quad 30 = 105$$

$$V_2 \quad 56 \quad 14 = 705$$

$$V_3 \quad 28 \quad 7 = 35$$

New mixture

$$V_1 \rightarrow 25 \quad 10 = 35$$

$$V_2 \rightarrow 28$$

$$7 = 35$$

$$V_3 \rightarrow 4$$

$$1 = 5$$

$$57$$

$$18 = 75$$

$$\text{Required \%} = \frac{18}{75} \times 100 = 24\%$$

15. 60 kg of an alloy A is mixed with 100 kg of alloy B. If alloy A has lead and tin in the ratio 3 : 2 and alloy B has tin and copper in the ratio 1 : 4, the amount of tin in the new alloy is

$$(a) 44 \text{ kg} \quad (b) 50 \text{ kg}$$

$$(c) 80 \text{ kg} \quad (d) 27 \text{ kg}$$

- Sol. (a) In 60 kg of alloy A,

$$\text{Lead} = \frac{3}{5} \times 60 = 36 \text{ kg}$$

$$\text{Tin} = \frac{2}{5} \times 60 = 24 \text{ kg}$$

In 100 kg of alloy B,

$$\text{Tin} = \frac{1}{5} \times 100 = 20 \text{ kg}$$

In 160 kg of new alloy,

$$\text{Tin} = 24 + 20 = 44 \text{ kg}$$

16. Two blends of a commodity costs ₹ 35 and ₹ 40 per kg respectively are mixed in the ratio 2 : 3 by weight. If one-fifth of the mixture is sold at ₹ 46 per kg and the remaining at the rate of ₹ 55 per kg. The profit percent is

$$(a) 20 \quad (b) 30$$

$$(c) 40 \quad (d) 50$$

- Sol. (c) Let 5 kg of mixture be prepared

∴ CP of 5 kg of mixture

$$= ₹ (2 \times 35 + 3 \times 40)$$

$$= ₹ (70 + 120) = ₹ 190$$

Total SP of this mixture

$$= ₹ (46 + 4 \times 55)$$

$$= ₹ (46 + 220) = ₹ 266$$

$$\therefore \text{Profit percent} = \left(\frac{266 - 190}{190} \right) \times 100$$

$$= \frac{7600}{190} = 40\%$$

17. 20 litres of a mixture contains milk and water in the ratio 3 : 1. Then the amount of milk to be added to the mixture so as to have milk and water in ratio 4 : 1 is :

$$(a) 4 \text{ litres} \quad (b) 5 \text{ litres}$$

$$(c) 6 \text{ litres} \quad (d) 7 \text{ litres}$$

- Sol. (b) In 20 litres of mixture,

$$\text{Milk} = \frac{3}{4} \times 20 = 15 \text{ litres}$$

$$\text{water} = \frac{1}{4} \times 20 = 5 \text{ litres}$$

Let the quantity of milk added be x litres.

According to the question,

$$\frac{15+x}{5} = \frac{4}{1}$$

$$\Rightarrow 15+x = 4 \times 5$$

$$\Rightarrow x = 20 - 15$$

$$\Rightarrow 5 \text{ litres.}$$

18. A vessel contains 60 litres of milk. 12 litres of milk is taken out from it and replaced by water. The 12 litres is again taken out and replaced by water. The ratio of milk and water in the resultant mixture is:

$$(a) 9 : 5 \quad (b) 16 : 9$$

$$(c) 16 : 10 \quad (d) 15 : 10$$

- Sol. (b) Remaining amount of milk

= Initial quantity

$$\left(1 - \frac{\text{quantity taken out}}{\text{Initial quantity}} \right)^n$$

$$= 60 \left(1 - \frac{12}{60} \right)^2 = 60 \left(1 - \frac{1}{5} \right)^2$$

$$= 60 \times \frac{4}{5} \times \frac{4}{5} = 38.4 \text{ litres}$$

Quantity of water = 60 - 38.4

= 21.6 litres

$$\therefore \text{Required ratio} \Rightarrow 38.4 : 21.6$$

$$\Rightarrow 16 : 9$$

19. A man purchased two chairs in ₹

900, he sells the first chair at $\frac{4}{5}$ of

its cost price and the second chair

at $\frac{5}{4}$ of its cost price. If during

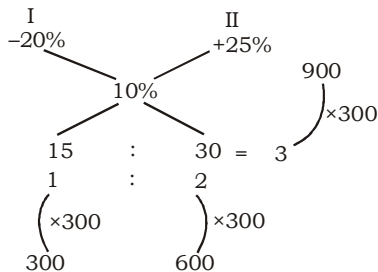
the whole transaction he earns a profit of ₹ 90 find the cost price of cheaper chair

$$\text{Sol. Ist } \frac{4}{5} \rightarrow \text{S.P} \quad - \frac{1}{5} \times 100 = -20\%$$

$$\text{IInd } \frac{5}{4} \rightarrow \text{S.P} \quad + \frac{1}{4} \times 100 = +25\%$$



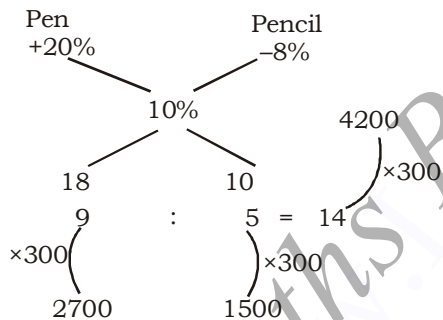
$$\therefore P\% = \frac{90}{900} \times 100 = 10\%$$



The C.P of cheaper chair = 300 ₹

20. Renu Purchased 200 pens and 100 pencils in 4200 ₹ she sells the each pen at the profit of 20% and each pencils at 8% loss. If during the whole transaction she earns a profit of 420 ₹. Find the cost price of each pen and each pencil ?

$$\text{Sol. Profit} = \frac{420}{4200} \times 100 = 10\%$$

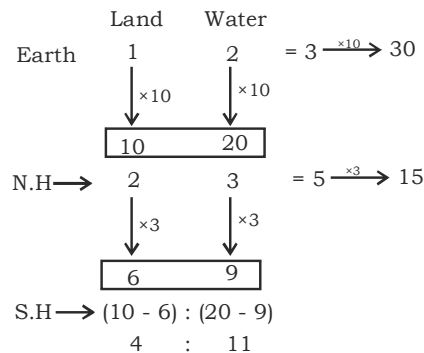


$$\text{C.P of each pen} = \frac{2700}{200} = 13.50 \text{ ₹}$$

$$\text{C.P of each pencils} = \frac{1500}{100} = 15 \text{ ₹}$$

21. Ratio of land and water on earth is 1 : 2 and ratio of land : water in northern hemisphere is 2 : 3 find the ratio of land : water in southern hemisphere.

Sol. Let on earth total Land & water = 30



22. A and B are two alloys of gold and copper Prepared by mixing metals in Proportion 7:2 and 7:11 respectively. If equal quantities of alloys are melted to form a third alloy C, the proportion of gold and copper in C will be
(a) 9:5 (b) 5:9
(c) 7:5 (d) 5:7

$$\text{Sol. (c) } \begin{array}{cc} 18 \text{ kg} & 18 \text{ kg} \\ \text{G : C} & \text{G : C} \\ 7 : 2 & 7 : 11 \\ (\times 2) \times 2 & (\times 1) \times 1 \\ 14 & 4 \end{array}$$

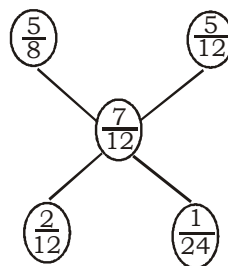
$\therefore$ Proportion of gold and copper in alloy C

$$\frac{14+7}{4+11} = \frac{21}{15} = \frac{7}{5} = 7:5$$

23. The ratio of the numbers of boys and girls in a school was 5:3. Some new boys and girls were admitted to the school, in the ratio 5:7. At this, the total number of students in the school become 1200, and the ratio of boys to girls changed to 7:5, The number of students in the school before new admission was

- (a) 700 (b) 960
(c) 720 (d) 900

Sol. (b)



$$4 : 1$$

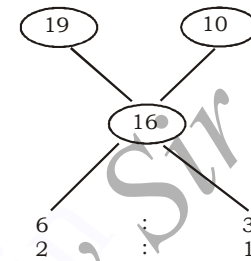
$$\therefore 5 \text{ units} = 1200$$

$$\therefore 1 \text{ unit} = 240$$

$$\therefore 4 \text{ units} = 240 \times 4 = 960$$

24. Silver is 19 times as heavy as water and Copper is 10 times as water. In what ratio should these be mixed to get an alloy 16 times as heavy as water?

Sol. Silver Copper



Required Ratio of silver to copper = 2 : 1

25. In what Proportion must water be mixed with spirit to gain 35% be selling it at cost price?

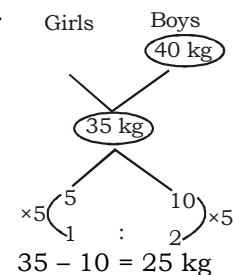
$$\text{Sol. Required Ratio} = 35 : 100$$

$$7 : 20$$

Note: In these type of question convert percentage into ratio, that will be answer.

26. In a class, The ratio of no. of girls to boys is 1 : 2. If the average weight of boys in 40 kg and the average weight of the boys and girls are 35kg, then the average weight of girls?

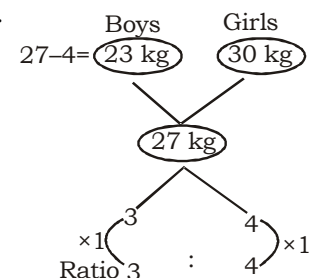
Sol.



So the avg. weight of girls 25 kg.

27. In a class. The ratio of no. of boys to no of girls is 3 : 4. If the average weight of the girls is 30 kg. and the average weight of both the boys and girls is 27 kg, then the average weight of the boys is?

Sol.

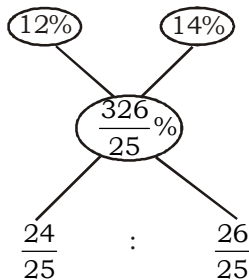


So the average weight of boys is 23 kg.



28. A merchant borrowed Rs. 2500 from two money lenders. For one loan he paid 12% p.a. and for the other 14% p.a. The total interest paid for one year was Rs. 326. How much did he borrow at each rate?

Sol. $\frac{326}{2500} \times 100 = \frac{326}{25} \%$



Ratio = 12 : 13

Amount given on 12% interest

$$= \frac{2500}{12+13} \times 12 = 1200/-$$

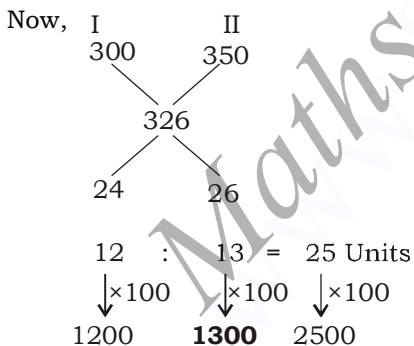
Amount given on 14% interest

$$= 2500 - 1200 = 1300$$

Alternative

$$12\% = \frac{2500 \times 12}{100} = 30$$

$$14\% = \frac{2500 \times 14}{100} = 350$$



29. How many kg of sugar at 42 paise per kg must a man mix with 25 kg of sugar at 24 paise per kg so that he may, on selling the mixture at 40 paise per kg, gain 25% on the outlay?

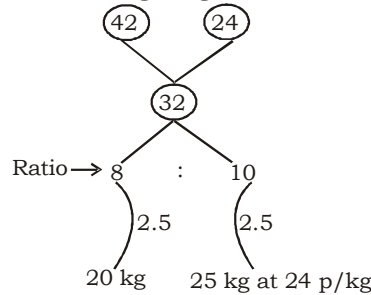
Sol. A.T.Q.

S.P. of the mixture = 40 paise/kg

C.P. of the mixture

$$= 40 \times \frac{100}{125} = 32 \text{ p/kg}$$

Now using alligation method



$\therefore$ sugar at 42 p/kg was = 20 kg

30. The ratio of the quantities of sugar, in which sugar costing Rs. 20 per kg and 15 per kg should be mixed so that there will be neither loss nor gain on selling the mixed sugar at the rate of Rs. 16 per kg?

Sol. A.T.Q.

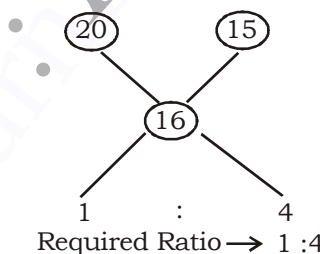
when there is no profit no loss

C.P = S.P

$\therefore$ C.P of mixed sugar

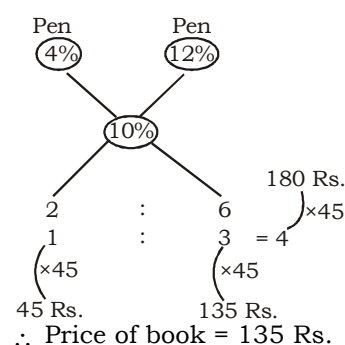
= Rs. 16/kg

Now by alligation method



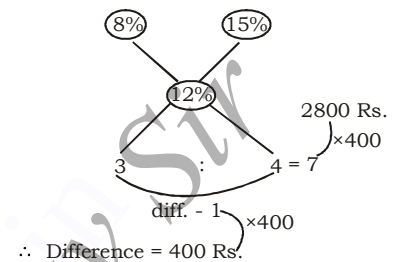
31. Neha buys a pen at 4% discount and a book at 12% discount. She overall gets a discount of 10%. If the marked price of both are Rs. 180 then find the price of book?

Sol.



32. A seller sells two watches at 8% and 15% discount each. Total marked price of both the items are Rs. 2800. Find the difference between marked price of both items, if total discount is of 12%?

Sol. By alligation Method,



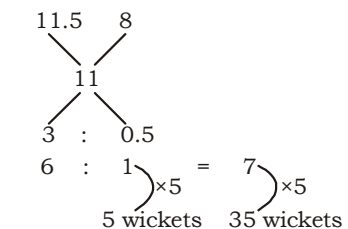
33. Average Run per wicket of a bowler is 11.5. In his next Innings bowler took 5 wickets and conceded 40 Runs, there by he reduced his bowling average by 0.5. Find total no. of wickets taken by him.

Sol. Old bowling average = 11.5

$$\text{New bowling average} = \frac{40}{5} = 8$$

Overall bowling average

$$= 11.5 - 0.5 = 11$$



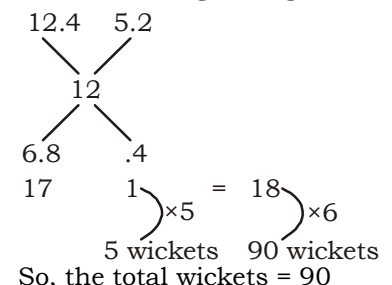
Total no. of wickets taken by him = 35

34. Zaheer khan whose bowling average is 12.4 runs per wicket takes 5 wickets for 26 runs and there by decrease his average by 0.4. Find the total no. of wickets?

Sol. Old bowling average = 12.4

$$\text{New bowling average} = \frac{26}{5} = 5.2$$

Overall bowling average = 12





35. In an alloy, zinc and copper are in the ratio 1 : 2. In the second alloy, the same elements are in the ratio 2 : 3. If these two alloys be mixed to form a new alloy in which two elements are in the ratio 5 : 8, the ratio of these two alloys in the new alloy is?

Sol. (d) According to the question,

	zinc : copper	
In first alloy	$1_{\times 65} : 2_{\times 65} = 3$	$\xrightarrow{65}$
second alloy	$2_{\times 39} : 3_{\times 39} = 5$	$\xrightarrow{39}$
New alloy	$5_{\times 15} : 8_{\times 15} = 13$	$\xrightarrow{15}$
		195

Ist alloy -	65 :	130
IId alloy -	78 :	117
New alloy -	75 :	120

Apply alligation

65	78
75	
3	10
= 3 : 10	

36. A and B are two alloys of gold and copper prepared by mixing metals in the ratio 5 : 3 and 5 : 11 respectively. Equal quantities of these alloys are melted to form a third alloy C. The ratio of gold and copper in the alloy 'C' is?

Sol. According to the question,

Alloy A $\rightarrow 5_{\times 2} : 3_{\times 2} = 8_{\times 2}$ equal quantity
Alloy B $\rightarrow 5 : 11 = 16$ is mixed

$$\text{Alloy A} \rightarrow 10 : 6 = 16$$

$$\text{Alloy B} \rightarrow 5 : 11 = 16$$

$$\downarrow : \downarrow$$

$$= 15 : 17$$

37. An alloy contains zinc, copper and tin in the ratio 2 : 3 : 1 and an other contains copper, tin and lead in the ratio 5 : 4 : 3. If equal weights of both alloys are melted together to form a third alloy, then the weight of lead per kg in the new alloy will be.

Sol. According to the question,

$$\text{Zinc : Copper : Tin Total}$$

$$2_{\times 2} : 3_{\times 2} : 1_{\times 2} = 6_{\times 2}$$

$$4 : 6 : 2 = 12$$

$$\text{Copper : Tin : Lead Total}$$

$$5 : 4 : 3 = 12$$

Weight of lead

$$= \frac{3}{12+12} = \frac{3}{24} = \frac{1}{8} \text{ kg.}$$

38. Alcohol and water in two vessels A and B are in the ratio 5 : 3 and 5 : 4 respectively. In what ratio, the liquids in both the vessels be mixed to obtain a new mixture in vessel C in the ratio 7 : 5 ?

Sol. According to the question,

$$\text{Alcohol : Water}$$

$$\text{Vessel A} \quad 5 : 3$$

$$\text{Vessel B} \quad 5 : 4$$

Now using Alligation,

A	B
$\frac{5}{8}$	$\frac{5}{9}$
7	
12	
$\frac{1}{36}$	$\frac{1}{24}$

$$= 24 : 36 = 2 : 3$$

39. A and B are two alloys of gold and copper in the ratio 7 : 2 and 7 : 11 respectively. If equal quantites of these two alloys are melted to form a new alloy 'C' then the ratio of gold and copper in C is?

Sol. According to the question,

$$\text{Gold : Copper Total}$$

$$\text{A} \rightarrow 7_{\times 2} = 14 : 2_{\times 2} = 4 \quad 9_{\times 2} = 18$$

$$\text{B} \rightarrow \frac{7}{21} : \frac{11}{15} = 18$$

$$= 7 : 5$$

40. The proportion of acid and water in three samples is 2 : 1, 3 : 2 and 5 : 3. A mixture containing equal quantities of all three samples is made. The ratio of water and acid in the mixture is?

Sol. According to the question,

$$\text{Acid : Water = Total}$$

$$\text{I} \quad 2_{\times 40} = 80 \quad 1_{\times 40} = 40 \quad 3 \quad \xrightarrow{\times 40}$$

$$\text{II} \quad 3_{\times 24} = 72 \quad 2_{\times 24} = 48 \quad 5 \quad \xrightarrow{\times 24}$$

$$\text{III} \quad 5_{\times 15} = 75 \quad 3_{\times 15} = 45 \quad 8 \quad \xrightarrow{\times 15}$$

$$\text{Ratio of quantity} = 227 : 133$$

$$\therefore \text{Required ratio} = 133 : 227$$

41. Two alloys are both made up of copper and tin. The ratio of copper and tin in the first alloy is 1 : 3 and in the second alloy is 2 : 5. In what ratio should the two alloys be mixed to obtain a new alloy in which the ratio of tin and copper be 8 : 3?

Sol. According to the question,

$$\text{Copper : Tin}$$

$$\text{First alloy} \rightarrow 1 : 3$$

$$\text{Second alloy} \rightarrow 2 : 5$$

$$\text{Mix. alloy} \rightarrow 3 : 8$$

Now using Alligation,

$$\text{Alloy-I} \quad \text{Alloy-II}$$

$\frac{1}{4}$	$\frac{2}{7}$
3	
11	
$\frac{1}{77}$	$\frac{1}{44}$

$$\text{Ratio of quantity} = 4 : 7$$

42. Acid and water are mixed in a vessel A in the ratio of 5 : 2 and in the vessel B in the ratio 8 : 5. In what proportion should quantities be taken out from the two vessels so as to form a mixture in which the acid and water will be in the ratio of 9 : 4?

Sol. According to the question,

$$\text{Acid : Water}$$

$$\text{Vessel A} \quad 5 : 2$$

$$\text{Vessel B} \quad 8 : 5$$

Now using alligation,

A	B
$\frac{5}{7}$	$\frac{8}{13}$
9	
13	
$\left(\frac{9}{13} - \frac{8}{13}\right) = \frac{1}{13}$	$\frac{2}{91} = \left(\frac{5}{7} - \frac{9}{13}\right)$

$$\text{Ratio quantity} = 7 : 2$$

43. An alloy contains copper, zinc and nickel in the ratio of 5 : 3 : 2. The quantity of nickel (in kg) that must be added to 100 kg of this alloy to have the new ratio 5 : 3 : 3 is.



- (a) 15 (b) 12
(c) 8 (d) 10

Sol. (d) Let y kg of nickel be mixed

$$\therefore \frac{20+y}{100+y} = \frac{3}{11}$$

$$\Rightarrow 220 + 11y = 300 + 3y$$

$$\Rightarrow 11y - 3y = 300 - 220$$

$$\Rightarrow 8y = 80$$

$$y = 10 \text{ kg}$$

Alternative

Copper	Zinc	Nickel	
5	3	2	$\times 10 \rightarrow 100 \text{ Kg.}$
5	3	3	$\left. \begin{array}{l} \times 10 \\ +1 \text{ Unit} \end{array} \right\} \rightarrow 100 \text{ Kg.}$

$$10 \text{ Units} = 100 \text{ Kg.}$$

$$\therefore 1 \text{ Unit} = \frac{100}{10} = 10 \text{ kg.}$$

44. 80 Litres of a mixture contains milk and water in the ratio of 27 : 5. How much more water is to be added to get a mixture containing milk and water in the ratio of 3 : 1?

- (a) 20 L (b) 10 L
(c) 15 L (d) 5 L

Sol.

$$\begin{array}{lcl} \text{Milk} & \text{Water} & \\ 27 & : & 5 \\ 3 \times 9 & : & 1 \times 9 \\ 27 & : & 9 = 36 \end{array} \quad \begin{array}{l} \times \frac{5}{2} \rightarrow 80 \\ + 4 \end{array}$$

$$\therefore 4 \text{ Unit} = 4 \times \frac{5}{2} = 10 \text{ litres}$$

45. In two types of stainless steel the ratio of chromium and steel are 2 : 11 and 5 : 21 respectively. In what proportion should the two types be mixed so that the ratio of chromium to steel in the mixed types becomes 7 : 32?

- (a) 1 : 3 (b) 1 : 2
(c) 2 : 3 (d) 3 : 4

Sol. (b)

Chromium	Steel	
A 2	: 11	$\times 6 \rightarrow 12$
B 5	: 21	$\times 3 \rightarrow 15$
New mixture $\rightarrow$ C 7	: 32	$\rightarrow 78$

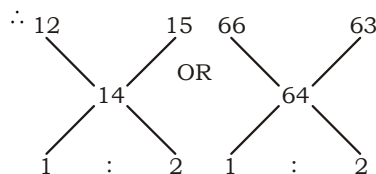
Chromium : Steel

A 12 : 66

B 15 : 63

New

mixture 14 : 64



Ratio = 1 : 2

46. In an alloy, the ratio of copper and zinc is 5 : 2. If 1.250 kg of zinc is mixed in 17 kg 500 g of alloy, then the ratio of copper and zinc will be.

- (a) 1 : 2 (b) 2 : 3
(c) 2 : 1 (d) 3 : 2

Sol. Weight of copper in 17 kg 500 gm, i.e., 17500 gm of alloy

$$= \frac{5}{7} \times 17500 \text{ gm of alloy}$$

$$\text{Weight of zinc} = (17500 - 12500) = 5000 \text{ gm}$$

1250 gm of zinc is mixed in alloy

$\therefore$ Total weight of zinc

$$= 1250 + 5000 = 6250$$

$\therefore$ Required ratio = 12500 : 6250

$$= 2 : 1$$

47. A jar contained a mixture of two liquids A and B in the ratio 4 : 1. When 10 litres of the mixture was taken out and 10 litres of liquid B was poured into the Jar, this ratio became 2 : 3. The quantity of liquid A contained in the Jar initially was

- (a) 40 litres (b) 8 litres
(c) 16 litres (d) 4 litres

Sol. (c) Let the initial quantity of liquids A and B in the jar be $4x$ and x litres respectively. After taking out 10 litres of the mixture, Liquid A

$$= 4x - \frac{4}{5} \times 10 = (4x - 8) \text{ litres}$$

Liquid B,

$$\Rightarrow x - \frac{1}{5} \times 10 = x - 2 \text{ litres}$$

After pouring 10 litres of liquid

$$B, \frac{4x-8}{x-2} = \frac{2}{3}$$

$$\Rightarrow 12x - 24 = 2x + 16$$

$$\Rightarrow 10x = 40$$

$$x = 4$$

$\therefore$ Quantity of liquid A = $4x = 4 \times 4 = 16$ litres

Alternative:-

$$\begin{array}{lcl} A & : & B \\ 4 & : & 1 \end{array} \quad \begin{array}{l} \times 5 \\ \times 2 \end{array} \rightarrow \begin{array}{l} 20 \text{ lit} \\ 2 \end{array}$$

$$2 \times 2 = 4 : 3 \times 2 = 6 \quad \begin{array}{l} \times 5 \\ \times 2 \end{array} \rightarrow \begin{array}{l} 10 \\ 12 \end{array}$$

$$5 \text{ Units} = 20$$

$$1 \text{ unit} = \frac{20}{5}$$

$$4 \text{ Units} = \frac{20}{5} \times 4 = 16 \text{ lit}$$

$$\text{Quantity of a in Mix} = 16 \text{ lit.}$$

48. A liquid 'P' is $1\frac{3}{7}$ times as heavy

as water and water is $1\frac{2}{5}$ times

as heavy as another liquid 'Q'. The amount of liquid 'P' that must be added to 7 litres of the liquid 'Q' so that the mixture may weigh as much as an equal volume of water, will be

- (a) $4\frac{2}{3}$ litres (b) 5 litres

- (c) $5\frac{1}{6}$ litres (d) 7 litres

Sol. (a) Let x litres of liquid P be mixed to 7 litres of liquid Q. According to question,

$$x \times \frac{10}{7} + \frac{5}{7} \times 7 = x + 7$$

$$\Rightarrow \frac{10x}{7} + 5 = x + 7$$

$$\Rightarrow 10x - 35 = 7x + 49$$

$$\Rightarrow 10x - 7x = 49 - 35$$

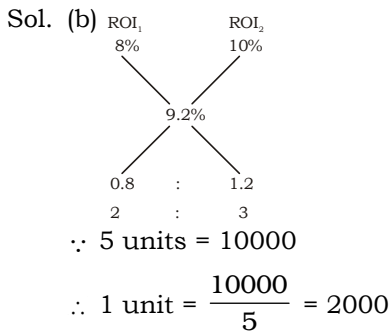
$$\Rightarrow 3x = 14$$

$$x = \frac{14}{3} = 4\frac{2}{3} \text{ litres}$$



49. A part of sum of ₹ 10000 is lent at 8% and the remaining sum at 10% per annum. If the average rate of interest is 9.2% then the two parts are

- (a) ₹ 5500, ₹ 45000
(b) ₹ 4000, ₹ 6000
(c) ₹ 6000, ₹ 5500
(d) ₹ 5000, ₹ 5000



∴ 1st part = 2 × 2000 = ₹ 4000
∴ 2nd part = 3 × 2000 = ₹ 6000

50. A shopkeeper mixes 8 kg of brick powder, which is freely available, in 50 kg of chilly powder. If the cost of pure chilly powder is ₹ 54 per kg, then the profit of the shopkeeper when he sells all the mixture at cost price is

- (a) 16% (b) 12%
(c) 17% (d) 19%

- Sol. (a) CP = 54 × 50 = 2700
Profit = 54 × 8 = 432 (As he sells goods at CP)
∴ Profit percentage

$$= \frac{432}{2700} \times 100 = 16\%$$

51. A bottle is full of dettol. One third of it, is taken out and then equal amount of water is poured into the bottle to fill it. This operation is done four times. Find the final ratio of dettol and water in the bottle.

- (a) 8 : 30 (b) 36 : 44
(c) 16 : 65 (d) 32 : 33

- Sol. (c) Remaining total

$$= \left(\frac{1 - \frac{1}{3}}{1} \right)^4 = \left(\frac{2}{3} \right)^4 = \frac{16}{81} = \frac{16}{81}$$

- ∴ Ratio of dettol and water in the final mixture = 16 : (81 - 16) = 16 : 65

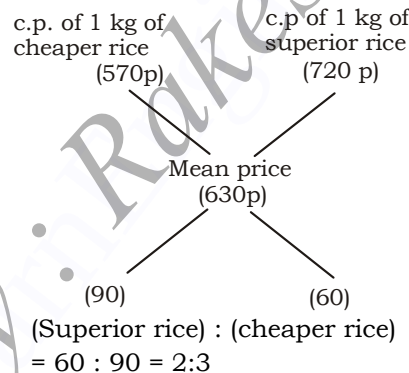
Alternate:-

3	2
3	2
3	2
3	2
81	16

Ratio of Dettol & water : 16 : (81 - 16) = 16 : 65

52. The ratio in which the rice at Rs. 7.20 per kg be mixed with rice at Rs. 5.70 per kg to produce a mixture worth Rs. 6.30 per kg is :
- (a) 1 : 3 (b) 2 : 3
(c) 3 : 4 (d) 4 : 5

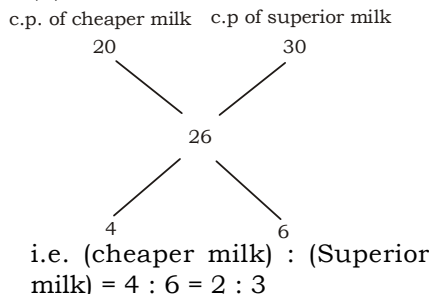
- Sol. (b)



53. A shopkeeper mixes Rs. 20 per kg milk with 30 per kg milk so that C.P. of the mixture will become Rs. 26 per kg. In what ratio, he should mix these two?

- (a) 3 : 4 (b) 2 : 3
(c) 3 : 2 (d) 4 : 3

- Sol. (b)



54. In a class of 50 students, the average weight of boys is 20 kg and the average weight of the girls is 32 kg. The fraction of boys out of the total students of the class is :

- (a) $\frac{5}{8}$ (b) $\frac{8}{5}$
(c) $\frac{4}{5}$ (d) data insufficient

- Sol. (d) Since we do not know either the average weight of the whole class or the ratio of no. of boys to girls.

55. In what proportion water be mixed with spirit to gain 12.5 % by selling it at cost price ?
- (a) 3 : 5 (b) 1 : 8
(c) 2 : 7 (d) 1 : 9

- Sol. (b) Profit = 12.5 % = $\frac{1}{8}$

Hence the ratio of water to spirit is 1 : 8

Since profit % = $\frac{\text{profit}}{\text{cost}} \times 100$

56. In what proportion water be added to spirit to gain 20 % by selling it at cost price ?
- (a) 1 : 5 (b) 2 : 5
(c) 3 : 5 (d) 4 : 5

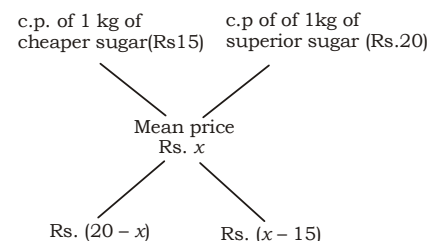
- Sol. (a) Gain = 20 % = $\frac{1}{5}$

Hence, the ratio of water to spirit is 1 : 5

Since, Gain % = $\frac{\text{Gain}}{\text{cost}} \times 100$

57. Sugar at Rs. 15 per kg is mixed with sugar at Rs. 20 per kg in the ratio 2 : 3. Find the price per kg of the mixture ?
- (a) Rs. 27 per kg
(b) Rs. 15 per kg
(c) Rs. 18 per kg
(d) Rs. 20 per kg

- Sol. (c) Let the mean price of the mixture be Rs. x.





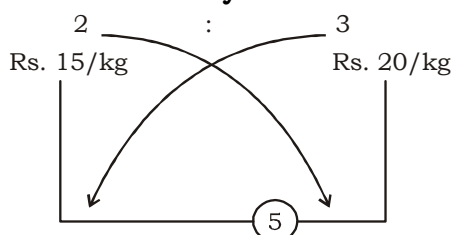
$$\therefore \frac{20 - x}{x - 15} = \frac{2}{3}$$

$$\Rightarrow 60 - 3x = 2x - 30$$

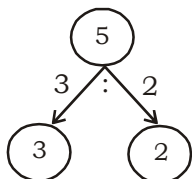
$$\Rightarrow 5x = 90 \Rightarrow x = 18$$

Thus, the price per kg of the mixture is Rs. 18.

Alternatively :



Now divide the difference i.e. $20 - 15 = 5$ in $3 : 2$

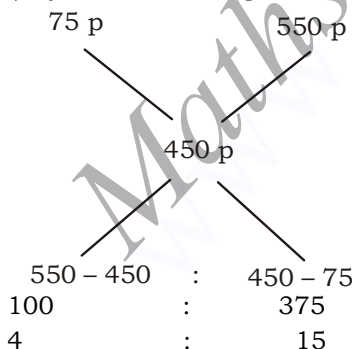


$\therefore$ mean price = Rs. $(15 + 3)$ or Rs. $(20 - 2) =$ Rs. 18/kg

58. In what proportion must tea worth 75 paise per packet be mixed with tea worth Rs. 5.50 per packet so that the mixture may cost Rs. 4.50 per cent ?

- (a) 3 : 11 (b) 4 : 15
(c) 15 : 11 (d) 4 : 5

Sol. (b) By method of Alligation.

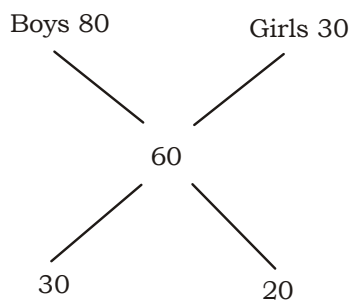


59. There are 65 students in a class, 39 rupees are distributed among them so that each boy gets 80 p and girl gets 30p. Find the number of boys and girls in that class.

- (a) 43, 40 (b) 36, 33
(c) 39, 26 (d) 45, 42

Sol. (c) Here, alligation is applicable for "money per boy of girl"

$$\text{Mean value of money per student} = \frac{3900}{65} = 60p$$



$\therefore$ Boys : Girls = 3 : 2

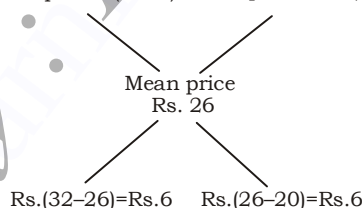
$\therefore$ Number of boys = $\frac{65}{3 + 2} \times 3 = 39$
and number of girls = $65 - 39 = 26$.

60. In what ratio two varieties of tea, one costs Rs. 20 per kg and the other costs Rs. 32 kg should be blended to produce blended variety of tea worth Rs. 26 per kg. ?

- (a) 1 : 1 (b) 2 : 1
(c) 1 : 2 (d) 3 : 2

Sol. (a)

c.p. of 1 kg of cheaper tea (Rs.20) c.p. of 1 kg of superior tea (Rs.32)



$\therefore$ The required ratio of two varieties of tea is 1 : 1

61. How many litres of pure acid are there in 15 litres of a 20 per cent solution ?

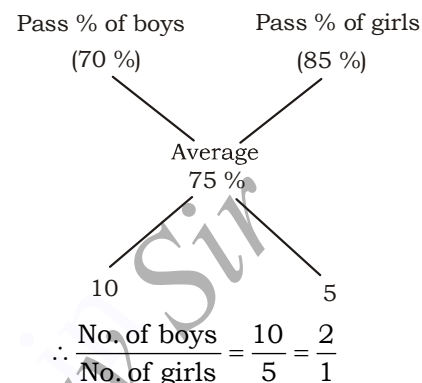
- (a) 3.5 (b) 2
(c) 2.8 (d) 3

Sol. (d) 20 % of 15 i.e. $\frac{20}{100} \times 15 = 3$ litres

62. In an examination out of 240 students 85 % of the girls and 70 % of the boys passed. How many boys appeared in the examination if total pass percentage was 75 % ?

- (a) 210 (b) 160
(c) 150 (d) 140

Sol. (b)



$\therefore$ No. of boys = $\frac{240 \times 2}{3} = 160$

63. In an alloy there is 12 % of copper. To get 69 kg of copper, how much alloy will be required ?

- (a) 424 kg (b) 575 kg
(c) 828 kg (d) $1736\frac{2}{3}$ kg

Sol. (b) $\therefore$ 12 kg copper is contained in 100 kg of alloy.

$\therefore$ 69 kg copper is contained in

$$= \frac{100}{12} \times 69 = 575 \text{ kg of alloy}$$

64. In what ratio must a grocer mix tea at Rs. 60 per kg, and Rs. 65 per kg, so that by selling the mixture at Rs. 68.20 per kg, he may gain 10 % ?

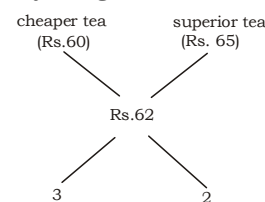
- (a) 3 : 2 (b) 3 : 4
(c) 3 : 5 (d) 4 : 5

Sol. (a) s.p. of 1 kg mixture = Rs. 68.20, gain = 10 %

$\therefore$ c.p. of 1 kg mixture

$$= \text{Rs.} \left(68.20 \times \frac{100}{110} \right) = \text{Rs. } 62$$

By Alligation Method,



$\therefore$ Required ratio = 3 : 2



65. 7 kg of tea costs Rs. 280 per kg is mixed with 9 kg of tea costs Rs. 240 per kg. The average price per kg of the mixed tea is :
 (a) Rs. 255.80 (b) Rs. 257.50
 (c) Rs. 267.20 (d) Rs. 267.50

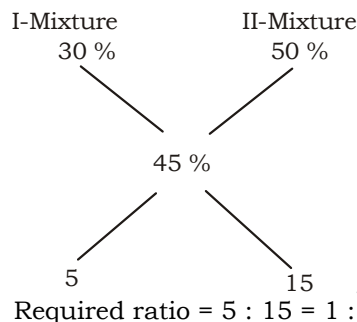
Sol. (b) Average price of blended tea

$$= \frac{280 \times 7 + 240 \times 9}{7 + 9} = \frac{1960 + 2160}{16}$$

$$= \frac{4120}{16} = \text{Rs. } 257.50$$

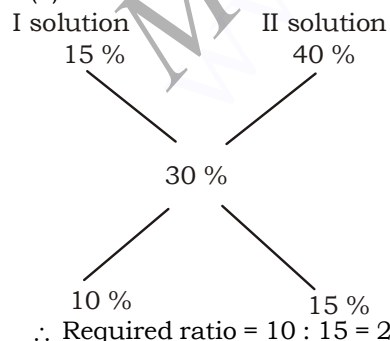
66. In what ratio must a mixture of 30 % alcohol strength be mixed with that of 50 % alcohol strength so as to get a mixture of 45 % alcohol strength ?
 (a) 1 : 2 (b) 1 : 3
 (c) 2 : 1 (d) 3 : 1

Sol. (b) By Alligation Method,



67. The ratio in which two sugar solutions of the concentrations 15 % and 40 % are to be mixed to get a solution of concentration 30 % is :
 (a) 2 : 3 (b) 3 : 2
 (c) 8 : 9 (d) 9 : 8

Sol. (a)



68. The ratio of milk and water in mixtures of four containers are 5 : 3, 2 : 1, 3 : 2 and 7 : 4 respectively. In which container is the quantity of milk, is minimum ?

(a) First (b) Second
 (c) Third (d) Fourth

Sol. (c) In first vessel, milk = $\frac{5}{8} = 0.625$

In second vessel, milk = $\frac{2}{3} = 0.66$

In third vessel, milk = $\frac{3}{5} = 0.60$

In fourth vessel, milk

= $\frac{7}{11} = 0.636$

i.e. third vessel quantity of milk is minimum.

69. An alloy contains copper, zinc and nickel in the ratio of 5 : 3 : 2. The quantity of nickel in kg that must be added to 100 kg of this alloy to have the new ratio 5 : 3 : 3 is :

(a) 8 (b) 10
 (c) 12 (d) 15

Sol. (b) **Initially** : copper : zinc : nickel = 5 : 3 : 2

Finally : copper : zinc : nickel = 5 : 3 : 3

Since, we are adding nickel, so the ratio of copper and zinc will be same (it is given same in the question) and change will be occur in nickel. So quantity of nickel added = 3 - 2 = 1

$\therefore$ Initial capacity = 5 + 3 + 2 = 10
 but given = 100 kg. = 10 Units = 100

1 Unit = 10

i.e. nickel added = 10 kg.

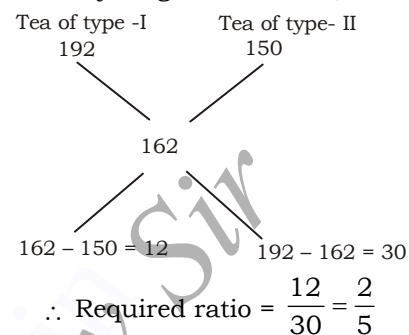
70. The ratio, in which tea costs Rs. 192 per kg is to be mixed with tea costs Rs. 150 per kg so that the mixed tea, when sold for Rs. 194.40 per kg, gives a profit of 20 %, is:

(a) 2 : 5 (b) 3 : 5
 (c) 5 : 3 (d) 5 : 2

Sol. (a) c.p. of mixed tea

$$= \frac{100}{120} \times 194.40 = \text{Rs. } 162/\text{kg}$$

By alligation Method,

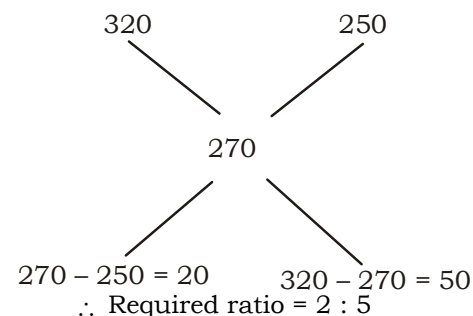


71. In what ratio Darjeeling Tea costs Rs. 320 per kg be mixed with Assam Tea costs Rs. 250 per kg so that there is a gain of 20 % by selling the mixture at Rs. 324 per kg?

(a) 1 : 2 (b) 2 : 3
 (c) 3 : 2 (d) 2 : 5

Sol. (d) c.p. of the mixture

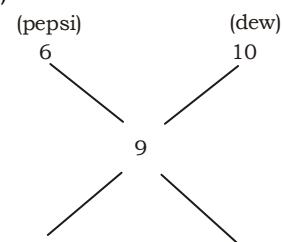
$$= \frac{324 \times 100}{120} = \text{Rs. } 270$$



72. How much 'Pepsi' at Rs. 6 per litre is added to 15 litre of 'dew' at Rs. 10 per litre so that the mixture be Rs. 9 per litre?

(a) 5 (b) 8
 (c) 10 (d) None of these

Sol. (a)



i.e. (pepsi) : (dew) = 1 : 3
 but quantity of dew = 1 : 3

$\therefore$ 3 Units = 15

$\therefore$ 1 Unit = 5 litres

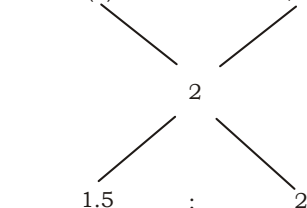
i.e. quantity of pepsi added = 5 litres.



73. How much water must be added to a bucket which contains 40 litres of milk at the cost price of Rs. 3.50 per litre so that the cost of milk reduces to Rs. 2 per litre ?

(a) 25 litres (b) 28 litres
(c) 30 litres (d) 35 litres

Sol. (c) c.p. of water (0) c.p. of milk (3.5)



$\therefore 2 \text{ Units} = 40$
 $\therefore 1 \text{ Unit} = 20$

and

$\therefore 1.5 \cong 30$

i.e. quantity of water added = 30 litres

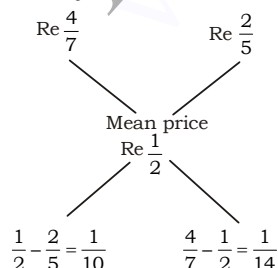
74. Milk and water in two vessels A and B are in the ratio 4 : 3 and 2 : 3 respectively. In what ratio the liquids in both the vessels should be mixed to obtain a new mixture in vessel C containing half milk and half water?

(a) 1 : 1 (b) 1 : 3
(c) 1 : 2 (d) 7 : 5

Sol. (d) Milk in A = $\frac{4}{7}$ of whole,

Milk in B = $\frac{2}{5}$ of whole Milk

in mixture of A and B = $\frac{1}{2}$ of whole Let the C.P. of unit quantity be Re 1.



$$\therefore \text{Required ratio} = \frac{1}{10} : \frac{1}{14}$$

$$= 14 : 10 = 7 : 5$$

Alternatively :

milk : water capacity		
A $\rightarrow 4 : 3$	$= 4+3 = 7$	$\rightarrow$ L.C.M. of 7, 5, 2 = 70
B $\rightarrow 2 : 3$	$= 2+3 = 5$	
C $\rightarrow 1 : 1$	$= 1+1 = 2$	

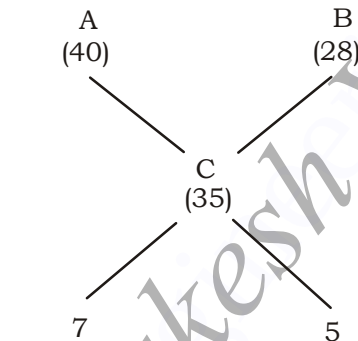
Now, make the capacity of each vessel same.

milk : water capacity		
A $\rightarrow 10 \times 4 : 3 \times 10$	$= 40 : 30$	$\rightarrow$ (70)
B $\rightarrow 14 \times 2 : 3 \times 14$	$= 28 : 42$	
C $\rightarrow 35 \times 1 : 1 \times 35$	$= 35 : 35$	

$\therefore$ Milk in A = $10 \times 4 = 40$

Milk in B = $14 \times 2 = 28$

and milk in C = $35 \times 1 = 35$



$\therefore A : B = 7 : 5$

75. 40 litres of a mixture of milk and water contains 10 % of water, the amount of water to be added, to make the water content 20 % in the new mixture is :

(a) 6 litres (b) 6.5 litres
(c) 5.5 litres (d) 5 litres

Sol. (d) **Initially :** water : milk = 10 : 90 = 1 : 9 ... (i)

Finally : water : milk = 20 : 80 = 1 : 4 ... (ii)

Since we are adding only water so the initial quantity of milk and final quantity of milk will be same. so multiplied (i) by 4 and (ii) by 9. we get,

	Water	:	Milk
Initially	4	$\rightarrow$	36
Finally	9	$\rightarrow$	36

$\therefore$ Initially capacity = $4 + 36$
= 40 litres

which is equal to the given capacity (i.e. 40 litres)

$\therefore$ water added = $9 - 4 = 5$ litres

76. A mixture contains spirit and water in the ratio 3 : 2. If it contains 3 litres more spirit than water, the quantity of spirit in the mixture is :

(a) 10 litres (b) 12 litres
(c) 8 litres (d) 9 litres

Sol. (d) **Given** - spirit : water = 3 : 2

$\therefore$ quantity of spirit more than that of water = $3 - 2 = 1$

but according to question it is 3 litres more.

$\therefore 1 \cong 3$

$\therefore 3 \cong 3 \times 3 = 9$

i.e. quantity of spirit = 9 litres.

77. How much pure alcohol has to be added to 400 ml of a solution containing 15 % of alcohol to change the concentration of alcohol in the mixture to 32 % ?

(a) 60 ml (b) 100 ml
(c) 128 ml (d) 68 ml

Sol. (b)

Alcohol : other liquid capacity

Initially 15 : 85 = 3 : 17 $\rightarrow 3+17 = 20$

Finally 32 : 68 = 8 : 17 $\rightarrow 8+17 = 25$

As we are adding alcohol, so quantity of other liquid will not be change which is already same i.e. 17.

$\therefore$ quantity of alcohol added = $8 - 3 = 5$

but the given initial capacity = 400 ml

$\therefore 20 \cong 400$

$\therefore 1 \cong \frac{400}{20} = 20$

$\therefore 5 \cong 20 \times 5 = 100$

i.e. quality of alcohol added = 100 ml

78. A mixture of 30 litres contain milk and water in the ratio of 7 : 3. How much water should be added to it so that the ratio of milk and water becomes 3 : 7?

(a) 40 litres (b) 49 litres
(c) 56 litres (d) 63 litres

Sol. (a)

Milk : Water

Initially 7 : 3 (i)

Finally 3 : 7 (ii)



As we are adding water, so quantity of milk will be same

∴ (i) × 3 and (ii) × 7, we get

Milk : Water Capacity

Initially 21 : 9 → 21 + 9 = 30

Finally 21 : 49 → 21 + 49 = 70

Initial capacity = 30 litres which is equal to the given capacity i.e. 30 litres

∴ quantity of water added = 49 - 9 = 40 litres

79. A barrel contains a mixture of wine and water in the ratio 3 : 1. How much fraction of the mixture must be drawn off and substituted by water so that the ratio of wine and water in the resultant mixture in the barrel becomes 1 : 1 ?

- (a) $\frac{1}{4}$ (b) $\frac{1}{3}$
(c) $\frac{3}{4}$ (d) $\frac{2}{3}$

Sol. (a)

Wine : Water Capacity

Initially 3 : 1 → 3 + 1 = 4 ... (i)

Finally 1 : 1 → 1 + 1 = 2 ... (ii)

But initial and final capacity must be same as we replace the withdrawn quantity of mixture by water

∴ multiplied (ii) by 2, we get

Wine : Water Capacity

Initially $\begin{bmatrix} 3 \\ 2 \end{bmatrix}$: 1 → 3 + 1 = 4 ... (i)

Finally $\begin{bmatrix} 3 \\ 2 \end{bmatrix}$: 2 → 2 + 2 = 4 ... (ii)

∴ Required answer = $\frac{3-2}{4} = \frac{1}{4}$

80. There are 81 litres pure milk in a container. One-third of milk is replaced by water in the container. Again one-third of mixture is extracted and equal amount of water is added. What is the ratio of milk to water in the new mixture?

- (a) 1 : 2 (b) 1 : 1
(c) 2 : 1 (d) 4 : 5

Sol. (d)

	Quantity of milk initially	Quantity of milk left
$\frac{1}{3}$ →	3	3 - 1 = 2
$\frac{1}{3}$ →	$\frac{3}{3 \times 3 = 9}$	$\frac{3 - 1 = 2}{2 \times 2 = 4}$

but given, initial quantity = 81 litres

∴ 9 Units = 81, 1 Unit = 9

⇒ 4 Units = $\frac{81}{9} \times 4 = 36$ litres

∴ Quantity of water = 81 - 36 = 45 litres

∴ Required ratio = 36 : 45 = 4 : 5

81. In 50 gm alloy of gold and silver, the gold is 80 % by weight. How much gold should be mixed to this alloy so that the weight of gold would become 95 %?

- (a) 200 gm (b) 150 gm
(c) 50 gm (d) 10 gm

Sol. (b) 80 % = $\frac{4}{5}$ and 95 % = $\frac{19}{20}$

• Gold : Silver Capacity

Initially 4 : 1 → 5

Finally 19 : 1 → 20

Quantity of silver will be same, which is already same.

∴ Quantity of gold added = 19 - 4 = 15

but the given initial capacity = 50 gm

∴ 5 Units = 50, 1 Unit = 10

∴ Quantity of gold added = 150 gm

82. Vessels A and B contain mixtures of milk and water in the ratios 4 : 5 and 5 : 1 respectively. In what ratio should quantities of mixture be taken from A and B to form a mixture in which milk to water is in the ratio 5 : 4 ?

- (a) 2 : 5 (b) 4 : 3
(c) 5 : 2 (d) 2 : 3

Sol. (c)

Vessel Milk : Water

A → : 4 : 5

B → : 5 : 1

(let) C → : 5 : 4

∴ Fraction of milk, in A

= $\frac{4}{9}$, in B = $\frac{5}{6}$, in C = $\frac{5}{9}$

By alligation method,

A	B
$\frac{4}{9}$	$\frac{5}{6}$
	$\frac{5}{9}$
$\frac{5}{6} - \frac{5}{9} = \frac{5}{18}$	$\frac{5}{9} - \frac{4}{9} = \frac{1}{9}$
∴ Required ratio = $\frac{5}{18} : \frac{1}{9} = 5 : 2$	

83. 200 litres of a mixture contains 15 % water and the rest is milk. The amount of milk that must be added so that the resulting mixture contains 87.5 % milk is :
(a) 30 litres (b) 35 litres
(c) 40 litres (d) 45 litres

Sol. (c) 15 % = $\frac{3}{20}$ and 87.5 % = $\frac{7}{8}$

Water : Milk Capacity

Initially 3 : (20 - 3 = 17) → 20 ... (i)

Finally (8 - 7 = 1) : 7 → 8 ... (ii)

Quantity of water will be same

∴ (ii) × 3, we get

Water : Milk Capacity

Initially 3 : 17 → 20

Finally 3 : 21 → 24

∴ Quantity of milk added = 21 - 17 = 4

but the given initial capacity = 200 litres

∴ 20 Units = 200, 1 Unit = 10

⇒ 4 Units = $\frac{200}{20} \times 4 = 40$ litres

i.e. quantity of milk added = 40 litres.



84. The milk and water in mixture are in the ratio 7 : 5. When 15 litres of water is added to it, the ratio of milk and water in the new mixture becomes 7 : 8. The total quantity of water in the new mixture is :

(a) 35 litres (b) 40 litres
(c) 60 litres (d) 96 litres

Sol. (b)

	Milk	:	Water		Capacity
Initially	7	:	5	→	12
Finally	7	:	8	→	15

As we are adding water, so quantity of milk will be same which is already same i.e. 7

∴ Quantity of water added $8 - 5 = 3$
but the given quantity of water added = 15 litres

∴ 3 Units = 15, 1 Unit = 5

⇒ 8 Units = $\frac{15}{3} \times 8 = 40$ litres

i.e. Quantity of water in the new (final) mixture = 40 litres.

85. An alloy contains zinc, copper and tin in the ratio 2 : 3 : 1 and another contains copper, tin and lead in the ratio 5 : 4 : 3. If equal weights of both alloys are melted together to form a third alloy, then the weight of lead per kg in the new alloy will be :

(a) $\frac{1}{2}$ kg (b) $\frac{1}{8}$ kg
(c) $\frac{3}{14}$ kg (d) $\frac{7}{9}$ kg

Sol. (b) 1st alloy → zinc : copper : tin = 2:3:1(i)

2nd alloy → copper : tin : lead = 5:4:3(ii)

∴ weight of 1st alloy = $2 + 3 + 1 = 6$ units

and weight of 2nd alloy = $5 + 4 + 3 = 12$ units

In 1st alloy, quantity of lead = 0 and in 2nd lead = 3

As **equal weights** of both alloys are taken to form a new alloy
∴ quantity of lead in new alloy

$$= \frac{3}{12+12} = \frac{3}{24} = \frac{1}{8}$$

86. In a 729 litres mixture of milk and water, the ratio of milk to water is 7 : 2. To get a new mixture containing milk and water in the ratio 7 : 3, the amount of water to be added is :

(a) 81 litres (b) 71 litres
(c) 56 litres (d) 50 litres

Sol. (a)

	Milk	:	Water		Capacity
Initially	7	:	2	→	9
Finally	7	:	3	→	10

As we are adding water, so quantity of milk will be same which is already same i.e. 7

∴ Quantity of water added = $3 - 2 = 1$
but the given initial capacity = 729 litres

∴ 9 Units = 729

⇒ 1 Unit = 81 litres

i.e. quantity of water added = 81 litres

87. In 40 litres mixture of milk and water the ratio of milk to water is 7 : 1. In order to make the ratio of milk and water 3 : 1, the quantity of water (in litres) that should be added to the mixture will be :

(a) 6 (b) $6\frac{1}{2}$
(c) $6\frac{2}{3}$ (d) $6\frac{3}{4}$

Sol. (c)

	Milk	:	Water		Capacity
Initially	7	:	1	→	8(i)
Finally	3	:	1	→	4(ii)

Quantity of milk will be same, as we are adding water.

so, (i) × 3 and (ii) × 7, we get

	Milk	:	Water		Capacity
Initially	21	:	3	→	24
Finally	21	:	7	→	28

so, quantity of water added = $7 - 3 = 4$

but, the given initial quantity = 40 litres

$$\therefore 24 \text{ Units} = 40, 1 \text{ Unit} = \frac{40}{24}$$

$$\Rightarrow \text{then, 4 Units} = \frac{40}{24} \times 4 = \frac{20}{3}$$

i.e. quantity of water added

$$= \frac{20}{3} = 6\frac{2}{3} \text{ litres}$$

88. In an alloy, zinc and copper are in the ratio 1 : 2. In the second alloy, the same elements are in the ratio 2 : 3. If these two alloys be mixed to form a new alloy in which two elements are in the ratio 5 : 8, the ratio of these two alloys in the new alloys is :

(a) 3 : 10 (b) 3 : 7
(c) 10 : 3 (d) 7 : 3

Sol. (a)

	Zinc	:	Copper
1st alloy	→ 1	:	2
2nd alloy	→ 2	:	3
new alloy	→ 5	:	8

∴ Fraction of zinc, in 1st alloy

$$= \frac{1}{3}, \text{ in 2nd alloy} = \frac{2}{5}$$

$$\text{and in new alloy} = \frac{5}{13}$$

By the method of Alligation,

1st alloy	2nd alloy
$\frac{1}{3}$	$\frac{2}{5}$
5	
13	
$\frac{2}{5} - \frac{5}{13} = \frac{1}{65}$	$\frac{5}{13} - \frac{1}{3} = \frac{2}{39}$

$$\therefore \text{Required ratio} = \frac{1}{65} : \frac{2}{39} = 3 : 10$$

89. A jar contained a mixture of two liquids A and B in the ratio 4 : 1. When 10 litres of the mixture was taken out and 10 litres of liquid B was poured into the jar, this ratio became 2 : 3. The quantity of liquid A contained in the jar initially was :

(a) 4 litres (b) 8 litres
(c) 16 litres (d) 40 litres



Sol. (c)

A : B capacity
Initially 4 : 1 → 5 ... (i)

after taken out 10 litres of the mixture,

capacity

A : B = 4 : 1 → 5 ... (ii)

After adding B, A : B = 2 : 3 ... (iii)

As we are adding B, so quantity of A will be same in (ii) & (iii)

∴ (iii) × 2, we get.

A : B = 4 : 6 ... (iv)

∴ From (ii) & (iv), quantity of B added = 6 - 1 = 5

but, the given quantity of B added = 10

∴ 5 Units = 10

∴ Capacity of (ii) = 10 litres

∴ Initial capacity = 10 + 10 = 20 litres

[As 10 litres of mixture is taken out]

∴ initial quantity of A = $\frac{4}{5} \times 20$ = 16 litres

90. A and B are two alloys of gold and copper prepared by mixing metals in the ratio 5 : 3 and 5 : 11 respectively. Equal quantities of these alloys are melted to form a third alloy C. The ratio of gold and copper in the alloy C is:

- (a) 25 : 33 (b) 33 : 25
(c) 15 : 17 (d) 17 : 15

Sol. (c)

Gold : Copper Capacity

A → 10 : 6 → 16

B → 5 : 11 → 16

∴ in C, Gold : copper

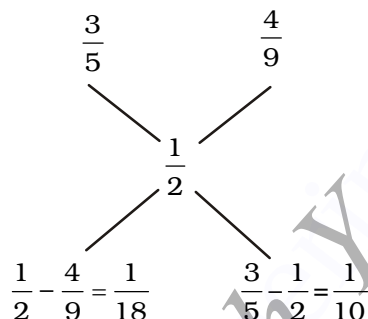
= (10 + 5) : (11 + 6) = 15 : 17

91. A mixture contains wine and water in the ratio 3 : 2 and another mixture contains them in the ratio 4 : 5. How many litres of the latter must be mixed with 3 litres of the former so that the resulting mixture may contain equal quantities of wine and water?

(a) $5\frac{2}{5}$ litres (b) $5\frac{2}{3}$ litres

(c) $4\frac{1}{2}$ litres (d) $3\frac{3}{4}$ litres

Sol. (a)



∴ Required ratio = $\frac{1}{18} : \frac{1}{10} = 5 : 9$

According to the question

5 units = 3 Litres

1 unit = $\frac{3}{5}$ litre

Hence, 9 units = $\frac{9 \times 3}{5}$ litres

⇒ $5\frac{2}{5}$ litres

92. The ratio of the volumes of water and glycerine in 240cc of a mixture is 1 : 3. The quantity of water (in cc) that should be added to the mixture so that the new ratio of the volumes of water and glycerine becomes 2 : 3 is :

- (a) 55 (b) 60
(c) 62.5 (d) 64

Sol. (b)

Water : Glycerine Volume

Initially 1 : 3 → 4

Finally 2 : 3 → 5

As we are adding water, so quantity of glycerine will be same which is already same (i.e. 3)

∴ quantity of water added = 2 - 1 = 1

but, the given initial volume = 240 cc

∴ 4 Units = 240 cc

⇒ 1 Unit = 60 cc

i.e. quantity of water added = 60 cc

93. The ratio of the quantities of an acid and water in a mixture is 1 : 3. If 5 litres of acid is further added to the mixture, the new ratio becomes 1 : 2. The quantity of new mixture in litres is :

- (a) 32 (b) 40
(c) 42 (d) 45

Sol. (d)

Acid : Water Capacity
Initially 1 : 3 → 4 ... (i)

Finally 1 : 2 → 3 ... (ii)

As we are adding acid, so quantity of water will be same for this, (i) × 2 & (ii) × 3, we get,

Acid : Water Capacity

Initially 2 : 6 → 8

Finally 3 : 6 → 9

∴ quantity of acid added = 3 - 2 = 1 but, the given quantity of acid added = 5 litres

∴ 1 Unit = 5 litres

⇒ 9 Units = 45 litres

i.e. the quantity (capacity) of the new mixture = 45 litres

94. Two equal volumed vessels are filled with the mixtures of water and milk in the ratio of 3 : 4 and 5 : 3 respectively. If the mixtures are poured into a third vessel, the ratio of water and milk in the third vessel will be :

- (a) 15 : 12 (b) 53 : 59
(c) 20 : 9 (d) 59 : 53

Sol. (d)

Water : Milk Capacity
In 1st 3 : 4 → 7 ... (i)

In 2nd 5 : 3 → 8 ... (ii)

Given that, both vessels are equal i.e. their capacity are same.

for this, (i) × 8 and (ii) × 7, we get

Water : Milk Capacity

In 1st 24 : 32 → 56

In 2nd 35 : 21 → 56



∴ in the new mixture of $56 + 56$
 $= 112$ units capacity

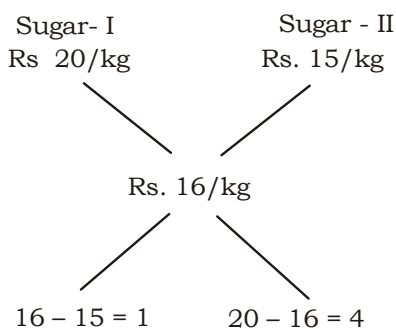
water : milk

$$(24+35) : (32+21) = 59 : 53$$

95. The ratio of the quantities of sugar, in which sugar costs Rs 20 per kg. and Rs. 15 per kg. should be mixed so that there will be neither loss nor gain on selling the mixed sugar at the rate of Rs. 16 per kg. is :

- (a) 2 : 1 (b) 1 : 2
 (c) 4 : 1 (d) 1 : 4

Sol. (d) By the method of alligation,



$$\therefore \text{Required ratio} = 1 : 4$$

96. Two types of alloys possess gold and silver in the ratio of 7 : 22 and 21 : 37. In what ratio should these alloys be mixed so as to have a new alloy in which gold and silver would exist in the ratio 25 : 62 ?

- (a) 13 : 8 (b) 8 : 13
 (c) 13 : 12 (d) 6 : 9

Sol. (a) Quantity of gold in 1 kg of alloy

$$'A' = \frac{7}{29}$$

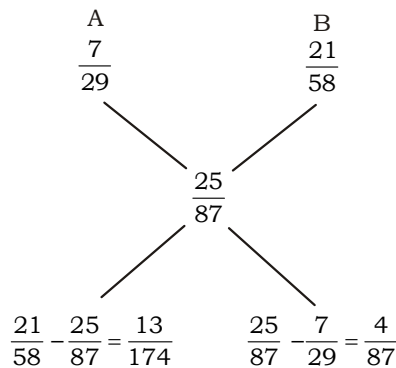
Quantity of gold in 1 kg of alloy

$$'B' = \frac{21}{58}$$

and Quantity of gold in 1 kg of

$$\text{alloy 'C'} = \frac{25}{87}$$

∴ By the method of alligation,



$$\text{Required ratio} = \frac{13}{174} : \frac{4}{87}$$

$$= 13 : 8$$

97. In one glass, milk and water are mixed in the ratio 3 : 5 and in another glass they are mixed in the ratio 6 : 1. In what ratio should the contents of the two glasses be mixed together so that the new mixture contains milk and water in the ratio 1 : 1 ?

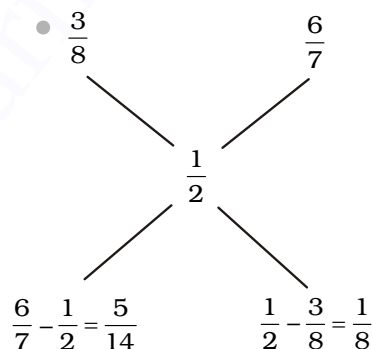
- (a) 20 : 7 (b) 8 : 3
 (c) 27 : 4 (d) 25 : 9

Sol. (a) In glass I, milk = $\frac{3}{8}$

$$\text{In glass II, milk} = \frac{6}{7}$$

$$\text{In new mixture, milk} = \frac{1}{2}$$

By Alligation method,

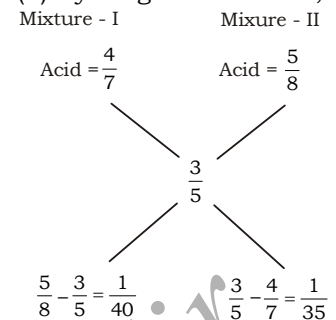


$$\therefore \text{Required ratio} = \frac{5}{14} : \frac{1}{8} = 20 : 7$$

98. Two vessels A and B contain acid and water in the ratio 4 : 3 and 5 : 3 respectively. Then the ratio in which these mixtures be mixed to obtain a new mixture in vessel C containing acid and water in the ratio 3 : 2 is :

- (a) 5 : 8 (b) 7 : 8
 (c) 7 : 5 (d) 4 : 7

Sol. (b) By Alligation method,



$$\text{Required ratio} = \frac{1}{40} : \frac{1}{35} = 7 : 8$$

99. The ratio of spirit and water in two mixtures of 20 litre and 36 litre is 3 : 7 and 7 : 5 respectively. Both the mixtures are mixed together. Now the ratio of the spirit and water in the new mixture is :

- (a) 25 : 29 (b) 9 : 10
 (c) 27 : 29 (d) 27 : 31

Sol. (c) In 20 litres of mixture,

$$\text{spirit} = \frac{3}{10} \times 20 = 6 \text{ litres,}$$

$$\text{water} = 14 \text{ litres}$$

In 36 litres of mixtures,

$$\text{spirit} = \frac{7}{12} \times 36 = 21 \text{ litres \&}$$

$$\text{water} = 36 - 21 = 15 \text{ litres}$$

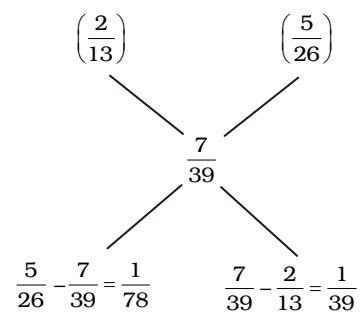
∴ Required ratio

$$= (21 + 6) : (14 + 15) = 27 : 29$$

100. In two types of stainless steel, the ratio of chromium and steel are 2 : 11 and 5 : 21 respectively. In what proportion should the two types be mixed so that the ratio of chromium to steel in the mixed type becomes 7 : 32 ?

- (a) 2 : 3 (b) 3 : 4
 (c) 1 : 2 (d) 1 : 3

Sol. (c) By Alligation method,
 Stainless steel - I



$$\therefore \text{Required ratio} = \frac{1}{78} : \frac{1}{39} = 1 : 2$$



101. Two vessels A and B contain milk and water in the ratio 8 : 5 and 5 : 2 respectively. The ratio in which these two mixtures be mixed to get a new mixture containing $69\frac{3}{13}\%$ milk is :

- (a) 3 : 5 (b) 5 : 2
(c) 5 : 7 (d) 2 : 7

Sol. (d) $69\frac{3}{13}\% = \frac{9}{13}$

By Alligation method,

$$\begin{array}{ccc}
 \text{A} & & \text{B} \\
 \frac{8}{13} & & \frac{5}{7} \\
 & \searrow \quad \swarrow & \\
 & \frac{9}{13} & \\
 & \swarrow \quad \searrow & \\
 \frac{5}{7} - \frac{9}{13} = \frac{2}{13 \times 7} & & \frac{9}{13} - \frac{8}{13} = \frac{1}{13}
 \end{array}$$

$\therefore$ Required ratio = $\frac{2}{13 \times 7} : \frac{1}{13} = 2 : 7$

102. A container contains 60 kg of milk. From this container 6 kg of milk was taken out and replaced by water. This process was repeated further two times. The amount of milk left in the container is :

- (a) 34.24 kg (b) 39.64 kg
(c) 43.74 kg (d) 47.6 kg

Sol. (c) Fraction of the milk taken out = $\frac{6}{60} = \frac{1}{10}$
and this process is repeated three times

Process	Quantity of milk initially	Quantity of milk left
I $\rightarrow$	10	$10 - 1 = 9$
II $\rightarrow$	10	$10 - 1 = 9$
III $\rightarrow$	10	$10 - 1 = 9$
	$10 \times 10 \times 10 = 1000$	$9 \times 9 \times 9 = 729$

but the given initial quantity of milk = 60 kg

$\therefore$ 1000 Units = 60

$$1 \text{ Unit} = \frac{60}{1000}$$

$$\Rightarrow 729 \text{ Units} = \frac{60}{1000} \times 729 = 43.74$$

103. A shopkeeper bought 15 kg of rice at the rate of Rs. 29 per kg and 25 kg rice at the rate of Rs. 20 per kg. He sold the mixture of both types of rice at the rate of Rs. 27 per kg. His profit in the transaction is :

- (a) Rs. 125 (b) Rs. 150
(c) Rs. 140 (d) Rs. 145

Sol. (d) c.p. of 40 kg of mixture = Rs $(15 \times 29 + 25 \times 20)$ = Rs 935
s.p. of 40 kg of mixture = 27×40 = Rs. 1080

$\therefore$ gain = $1080 - 935$ = Rs. 145

104. A and B are two alloys have gold and copper in the ratio 7 : 2 and 7 : 11 respectively. If equal quantities of these two alloys are melted to form a new alloy C, then the ratio of gold and copper in C is :

- (a) 6 : 5 (b) 9 : 4
(c) 12 : 7 (d) 7 : 5

Sol. (d)

	Gold	Copper	Capacity
A $\rightarrow$	7	2	$\rightarrow 9$(i)
B $\rightarrow$	7	11	$\rightarrow 18$(ii)

$\therefore$ New alloy C, contains equal quantity (capacity) of A & B for this, multiplied (i) by (ii), we get

	Gold	Copper	Capacity
A $\rightarrow$	14	4	$\rightarrow 18$
B $\rightarrow$	7	11	$\rightarrow 18$

$\therefore$ in C, Gold : Copper
= $(14 + 7)$: $(11 + 4)$
= 21 : 15
= 7 : 5

105. A can contains a mixture of two liquids A and B in the ratio 7 : 5. When 9 litres of mixture is taken out and same amount of the Can is filled with B, the ratio of A and B, becomes 7 : 9. How many litres of liquid A was contained by the initially?

- (a) 10 (b) 20
(c) 21 (d) 25

Sol. (c)

A : B capacity
Initially 7 : 5 $\rightarrow$ 12(i)

$\downarrow$ - 9 litres

A : B capacity
7 : 5 $\rightarrow$ 12(ii)

$\downarrow$ after adding 9 litres of B

A : B capacity
7 : 9 $\rightarrow$ 16(iii)

Quantity of A is same in (ii) & (iii)

$\therefore$ Quantity of B added = $9 - 5 = 4$
but the given quantity of B added = 9 litres

$\therefore 4 \cong 9$

$\Rightarrow 12 \cong 27$ litres

$\therefore$ Initial capacity = $27 + 9 = 36$ litres

$\therefore$ quantity of liquid A initially

$$= \frac{7}{12} \times 36 = 21 \text{ litres.}$$

106. Several litres of acid were drawn from a 54 litre vessel full of acid and an equal amount of water was added again the same volume of the mixture was drawn off and replaced by water. As a result, the vessel contained 24 litres of pure acid. How much of the acid was drawn off initially?

- (a) 12 litres (b) 16 litres
(c) 18 litres (d) 24 litres

Sol. (c) $\frac{\text{Final quantity of Acid}}{\text{Initial quantity of Acid}}$

$$= \sqrt{\frac{24}{54}} = \sqrt{\frac{4}{9}} = \frac{2}{3}$$

i.e. quantity of acid drawn off each time = $3 - 2 = 1$

but initial quantity = 51 litres (given)

$\therefore 3 \cong 54$ litres

$\therefore 1 \cong 18$ litres

i.e. quantity of acid drawn off = 18 litres



107. A container of certain quantity is full of milk. 8 litres of milk is drawn off and replaced by water and this process is repeated three times more. Therefore the ratio of water and milk becomes 65 : 16. Find the capacity of the container ?

- (a) 24 litres (b) 16 litres
(c) 27 litres (d) 25 litres

Sol. (a) Water : Milk $\Rightarrow$ Milk : Mixture
65 : 16 16 : (65 + 16 = 81)
i.e.

$$\frac{\text{Final quantity of milk}}{\text{Initial quantity of milk}} = \sqrt[4]{\frac{16}{81}} = \frac{2}{3}$$

[$\therefore$ process is repeated 4 times]

i.e. quantity drawn off each time = 3 - 2 = 1

but it is given that quantity drawn off = 8 litres

$$\therefore 1 \cong 8 \text{ litre} \\ \Rightarrow 3 \cong 8 \times 3 = 24 \text{ litres}$$

i.e. capacity of the container or initial quantity of milk = 24 litres.

108. A container of 64 litres capacity is filled with pure milk. Some quantity of milk is drawn off and replaced by water. This process is repeated two times more. Find the quantity drawn off every time if final ratio of water and milk becomes 37 : 27 ?

- (a) 18 litres (b) 12 litres
(c) 24 litres (d) 16 litres

Sol. (d) Final quantity
 $\Rightarrow$ water : milk = 37 : 27
 $\Rightarrow$ milk : mixture
= 27 : (37 + 27 = 64)

$$\frac{\text{Final quantity of milk}}{\text{Initial quantity of milk}} = \sqrt[3]{\frac{27}{64}} = \frac{3}{4}$$

$$\therefore \text{quantity drawn off every time} = 4 - 3 = 1$$

Given, initial quantity of milk = 64 litres

$$\therefore 4 \cong 64 \text{ litres} \\ \Rightarrow 1 \cong 16 \text{ litres}$$

i.e. quantity drawn off every time = 16 litres.

109. A milkman mixes water and milk in the ratio 1 : 2. If the cost price of water is one-tenth of milk and the milkman claims to sell the milk at a profit of 20 %, then what is his actual net profit percentage ?

- (a) 72 % (b) 82 %
(c) 79 % (d) 68 %

Sol. (a) 50 % = $\frac{1}{2}$ i.e. he mixes milk and water in the ratio 2 : 1
Let us say, in 100 litres milk, he mixes 50 litres water

$\therefore$ c.p. of water = x per 100 litres,

i.e. $\frac{x}{2}$ per 50 litres.

total mixture = 100 + 50 = 150 litres

$\therefore$ c.p. of 150 litres milk = 15 x
and c.p. of 150 litres mixture

$$(\text{water} + \text{milk}) = 10x + \frac{x}{2} = 10.5x$$

Given profit = 20 %

$$\therefore \text{s.p. of milk} = (1.2) \times 15x = 18x$$

So, profit percentage

$$= \frac{18x - 10.5x}{10.5x} \times 100$$

$$= 72 \% \text{ (approximately)}$$

110. An empty container is filled with pure alcohol. The alcohol is slowly allowed to run out and when the container is $\frac{1}{4}$ empty, it is replaced with water. Next, when the container is half empty it is again filled with water.

Finally, when it is $\frac{3}{4}$ empty, it is again filled with water. What percentage of container is alcohol now ?

- (a) $8\frac{1}{2} \%$ (b) $11\frac{3}{4} \%$
(c) $9\frac{3}{8} \%$ (d) $14\frac{3}{8} \%$

Sol. (c)

	Total quantity of alcohol	Quantity of alcohol left
$\frac{1}{4} \rightarrow$	4	$4 - 1 = 3$
$\frac{1}{2} \rightarrow$	2	$2 - 1 = 1$
$\frac{3}{4} \rightarrow$	4	$4 - 3 = 1$
	$4 \times 2 \times 4 = 32$	$3 \times 1 \times 1 = 3$

$$\therefore \text{Required percentage} = \frac{3}{12} \times 100 = \frac{75}{8} = 9\frac{3}{8} \%$$

111. Two vessels A and B contain mixtures of spirit and water. A mixture of 3 parts from A and 2 parts from B is found to contain 29 % of spirit and a mixture of 1 part from A and 9 parts from B is found to contain 34 % of spirit. Find the percentage of spirit in B and A :

- (a) 35, 25 (b) 40, 20
(c) 25, 25 (d) 50, 50

Sol. (a) Let $x \%$ be the percentage of spirit in A and $y \%$ in B.

$$\frac{3x}{100} + \frac{2y}{100} = 29\% \text{ of } (3 + 2)$$

$$\Rightarrow 3x + 2y = 145 \quad \dots (i)$$

$$\text{and } \frac{x}{100} + \frac{9y}{100} = 34\% \text{ of } (1 + 9)$$

$$\Rightarrow x + 9y = 340 \quad \dots (ii)$$

Solving (i) and (ii), we get x

$$= 25 \text{ and } y = 35$$

i.e. A contains 25 % spirit and B contains 35 % of spirit.

112. Two equal containers are filled with a mixture of water and alcohol. One of them contains three times as much alcohol as in the other. The mixtures in the two containers are then mixed and it is found that the ratio of water to alcohol is 3 : 2. Find the ratio of water to alcohol in each of the original containers :

- (a) 2 : 1, 3 : 4 (b) 1 : 3, 1 : 2
(c) 2 : 3, 4 : 1 (d) 1 : 3, 2 : 1



Sol. (c) In the new mixture, water : alcohol = $3 : 2 = 3 \times 4 : 2 \times 4 = 12 : 8$

⇒ The capacity of each container = $(12 + 8)/2 = 10$ units

⇒ The ratios of water to alcohol of the containers are $4 : 6$ and $8 : 2 = 2 : 3$ and $4 : 1$

113. Three beakers namely A, B and C each contain 100 ml of milk and water solution. The ratio of milk and water in the beakers A,

B and C is $1 : 3$, $1 : 4$ and $2 : 3$ respectively. 40 ml of solution is transferred from beaker A to beaker C and then 28 ml of solution is transferred from beaker C to beaker B. Find the final ratio of milk in the beakers A, B and C :

- (a) $3 : 6 : 8$ (b) $6 : 15 : 20$
(c) $15 : 28 : 42$ (d) None of these

Sol. (a) Initial quantity of milk and water in the beakers.

Beaker A : Milk = 25 ml and water = 75 ml

Beaker B : Milk = 20 ml and water = 80 ml

Beaker C : Milk = 40 ml and water = 60 ml

After 40 ml is transferred from A to C, the quantity of milk and water in the beakers is as follows.



Beaker A : Milk = $25 - 10 = 15$ ml and

Water = $75 - 30 = 45$ ml

Beaker B: Milk = $40 + 10 = 50$ ml and

Water = $60 + 30 = 90$ ml.

Now, Milk : Water in Beaker C = $5 : 9$

After 28 ml is transferred from C to B:

Beaker A : Milk = 15 ml and water = 45 ml Beaker B : Milk

= $20 + 10 = 30$ ml and Water = $80 + 18 = 98$ ml

Beaker C : Milk = $50 - 10 = 40$ ml and Water = $90 - 18 = 72$ ml

∴ Required ratio

= $15 : 30 : 40 = 3 : 6 : 8$



Exercise

1. The average weight of a class of 40 students is 30 kg and the average weight of a class of 20 students is 15 kg. Find the average weight of both the classes combined.
(a) 20 (b) 25
(c) 17.5 (d) 15
2. If the average weight of a class is 15 kg and the average weight of another class is 30 kg, then find the ratio of the students of the first class to the another class students when the average weight of both the classes is 25 kg:
(a) 1 : 2 (b) 2 : 1
(c) 1 : 3 (d) 3 : 4
3. The average weight of girls is 15 and the average weight of boys is 30 and the average weight of boys and girls both is 25. If the number of boys are 12, then the number of girls are:
(a) 4 (b) 6
(c) 10 (d) 18
4. The ratio of number of girls to number of boys is 1 : 2. If the average weight of the boys is 30 kg and the average weight of both the boys and girls be 25 kg, then the average weight of the girls is :
(a) 15 kg (b) 20 kg
(c) 35 kg (d) 40 kg
5. Two varieties of milk with different prices is mixed in the ratio of 2 : 3. The price of first type of milk is Rs. 10 per litre while the price of second type of milk is Rs. 15 per litre, respectively. The average price of the mixture (per litres) is :
(a) Rs. 12 (b) Rs. 13
(c) Rs. 14 (d) Rs. 15
6. 5 kg of superior quality of rice is mixed with 25 kg of inferior quality rice. The price of superior quality and inferior quality rice is Rs. 18 and Rs. 12 respectively. The average price per kg of the mixture is:
(a) Rs. 13 (b) Rs. 15
(c) Rs. 18 (d) Rs. 21
7. 16 litres of wine is mixed with 5 litres of water. The price of wine is Rs. 12 litre and the price of water is Rs. 33 per litres. The average price of the mixture per litres is:
(a) Rs. 15 (b) Rs. 17
(c) Rs. 23 (d) Rs. 27
8. Bhuvnesh travels 30 minutes at the speed of 25 km/hr. Further he travels 20 minutes at the speed of 40 km/hr. Find his average speed.
(a) 25 km/hr
(b) 30 km/hr
(c) 31 km/hr
(d) None of these
9. A milkman has two types of milk. In the first container the percentage of milk is 80% and in the second container the percentage of milk is 60%. If he mixes 28 litres of milk of the first container to the 32 litres of milk of the second container, then the percentage of milk in the mixture is :
(a) 63.99 (b) 69.33
(c) 72.5 (d) 75.2
10. Rakesh Yadav reader publication sold the 30% books at the profit of 50% and 70% books at the profit of 10%. Find the average profit percent of the Rakesh Yadav Reader publication shop is, if it sells only these two kinds of books:
(a) 15 (b) 22
(c) 25 (d) 45
11. Bhuvnesh covered 150 km distance in 10 hours. The first part of his journey he covered by car, then he hired a rickshaw. The speed of car and rickshaw is 20 km/hr and 12 km/hr respectively. The ratio of distances covered by car and the rickshaw respectively are :
(a) 2 : 3
(b) 4 : 5
(c) 1 : 1
(d) None of these
12. A mixture of sugar is sold at Rs. 3.00 per kg. This mixture is formed by mixing the sugar of Rs. 2.10 and Rs. 2.52 per kg. What is the ratio of cheaper to the costlier quality in the mixture if the profit of 25% is being earned.
(a) 5 : 2 (b) 2 : 7
(c) 2 : 5 (d) 15 : 8
13. A milkman has 20 litres of milk. If he mixes 5 litres of water, which is freely available, in 20 litres of pure milk. If the cost of pure milk is Rs. 18 per litre, then the profit of the milkman, when he sells all the mixture at cost price, is:
(a) 20% (b) 25%
(c) 33.33% (d) 18%
14. In what ratio should water and soda be mixed that after selling the mixture at the cost price a profit of 33.33% is made ?
(a) 1 : 4 (b) 1 : 3
(c) 2 : 3 (d) 3 : 4
15. In what ratio should freely available water be mixed with the soda worth Rs. 60 per litre so that after selling the mixture at Rs. 50 per litre, the profit will be 25% ?
(a) 1 : 2 (b) 2 : 3
(c) 3 : 4 (d) 4 : 5



16. A mixture of water and milk contains 80% milk. In 50 litres of such a mixture, how many litres of water is required to increase the percentage of water to, 50% ?
 (a) 20
 (b) 15
 (c) 30
 (d) None of these
17. In a 50 litre mixture of water and milk, water is only 20%. The milkman gives 10 litre 'of this' mixture to a customer and then he adds up 10 litres of pure water in the remaining mixture. The percentage of water in the final mixture is :
 (a) 84% (b) 74%
 (c) 26% (d) 36%
18. There are three types of Butter, Parag, Amul and Nestle. The ratio of fat to the non-fat contents in butter is 4 : 5, 5 : 6, 6 : 7 respectively. If all these three types of butter is mixed in equal quantity, the ratio of fat to the non-fat contents in the mixture will be:
 (a) 1751 : 2110 (b) 175 : 543
 (c) 3 : 5 (d) 10 : 18
19. Rakesh Yadav purchased two different kinds of alcohol. In the first mixture the ratio of alcohol to water is 3 : 4 and in the second mixture it is 5 : 6. If he mixes the two given mixture and makes a third mixture of 18 litres in which the ratio of alcohol to water is 4 : 5, the quantity of first mixture (whose ratio is 3 : 4) is required to make the 18 litres of the third kind of mixture is:
 (a) 6 (b) 7
 (c) 8 (d) 9
20. Some amount out of Rs. 6000 was lent out at 10% per annum and the rest amount @ at 20% per annum and thus in 4 years the total interest from both the amounts collected was Rs. 3400. What is the amount which was lent out @ 10% per annum?
 (a) Rs. 2500 (b) Rs. 2800
 (c) Rs. 3200 (d) Rs. 3500
21. From the 50 litres of pure milk, 5 litres of milk is taken out and after it 5 litres of water is added to the rest amount of milk. Again 5 litres of mixture of milk and water is drawn out and it was replaced by 5 litres of water. If this process is continued similarly for the three times, the amount of milk left after the third replacement:
 (a) 45 Litre (b) 36.45 Litre
 (c) 40.5 Litre (d) 42.5 Litre
22. From a tank of petrol, which contains 200 litres of petrol, the seller replaces each time with kerosene when he sells 40 litres of petrol (or its mixture). Every time he sells out only 40 litres of petrol (pure or impure). After replacing the petrol with kerosene 4th time, the total amount of kerosene in the mixture is :
 (a) 81.92Litre
 (b) 96Litre
 (c) 118.08Litre
 (d) None of these
23. From a container of beer, a thief has stolen 15 litres of beer and replaced it with same quantity of water. He again repeated the same process. Thus in three attempts the ratio of beer and water became 343 : 169. The initial amount of beer in the container was :
 (a) 75 litres (b) 100 litres
 (c) 150 litres (d) 120 litres
24. A jar was full with milk. A person used to draw out 20% of the milk from the jar and replaced it with sugar solution. He has repeated the same process 4 times and thus there was only 512 gm of milk left in the jar, the rest part of the jar was filled with the sugar solution. The initial amount of the milk in the jar was :
 (a) 1.25 kg
 (b) 1 kg
 (c) 1.5 kg
 (d) None of these
25. In a MCD parking there are some two wheelers and rest are 4 wheelers. If wheels are counted, there are total 520 wheels but the incharge of the parking told me that there are only 175 vehicles. If no vehicle has a stepney, then the no. of two wheelers is:
 (a) 75 (b) 100
 (c) 90 (d) 85
26. In my big pocket there are Rs. 25 consisting of only the denominations of 20 paise and 50 paise. Thus there are total 80 coins in my pocket. The no. of coins of the denomination of 50 paise is :
 (a) 30 (b) 70
 (c) 50 (d) 25
27. There are some pigeons and sheep in a grazing field. The no. of total heads are 60 and total legs are 168 including both pigeons and sheep. The no. of sheep is :
 (a) 18 (b) 26
 (c) 24 (d) 36
28. In the 75 litres of mixture of soda and water, the ratio of soda and water is 4 : 1. The quantity of water required to make the ratio of soda and water 3 : 1 is:
 (a) 1 litre (b) 3 litres
 (c) 4 litres (d) 5 litres



29. In my office(Rakesh Yadav Reader Publication) the average age of all the female employees is 21 years and that of male employees is 32 years, where the average age of all the (male and female) employees is 28 years. The total no. of employees in my office could be:
 (a) 35 (b) 78
 (c) 231 (d) 90
30. A Bus agency has 108 Buses. He sold some Bus at 9% profit and rest at 36% profit. Thus he gains 17% on the sale of all his Buses. The no. of Buses sold at 36% profit is :
 (a) 25 (b) 32
 (c) 35 (d) 75
31. Rs. 69 were divided among 115 students so that each girl gets 50 paise less than a boy. Thus each boy recieved twice the paise as each girl received. The no. of girls in the class is:
 (a) 92 (b) 42
 (c) 33 (d) 23
32. In what proportion water be mixed with milk to gain 12.5% by selling it at cost price ?
 (a) 3 : 5 (b) 1 : 8
 (c) 2 : 7 (d) 1 : 9
33. A butler stole wine from shop containing 50% of spirit, then he replenished it by different wine containing 20% spirit. Thus there was only 30% strength (spirit) in the new mixture. How much of the original wine did he steal ?
 (a) $\frac{1}{3}$ (b) $\frac{2}{3}$
 (c) $\frac{1}{2}$ (d) $\frac{1}{4}$
34. Mr. Rakesh Yadav purchased two book factories, one in India and other one in China for total Rs. 72 crores. Later on he sold the Indian factory at 16% profit and Chinese factory at 24% profit. Thus he gained a total profit of 19%. The selling price of Indian factory is :
 (a) 45 crore
 (b) 52.2 crore
 (c) 8.55 crore
 (d) can not be determined
35. In a 25 litres mixture of milk and water, the water is only 20%. How many litres of water is required to increase the percentage of water to 90% ?
 (a) 45 litres (b) 70 litres
 (c) 115 litres (d) 175 litres
36. A milkman sells the milk at the cost price but he mixes the water (freely available) in it and thus he gains 9.09%. The quantity of water in the mixture of 1 litre is :
 (a) 83.33 mL
 (b) 90.90 mL
 (c) 99.09 mL
 (d) can't be determined
37. The price of petrol is Rs. 60 per litre and the price of oil is Rs. 40 per litres. In what ratio the petrol and oil be mixed such that the profit after selling the mixture at Rs. 75 per litre be 25% ?
 (a) 1 : 1
 (b) 3 : 2
 (c) 5 : 1
 (d) such a mixture is not possible
38. A trader sells total 315 TV sets. He sells black and white TV sets at a loss of 6% and colour TV sets at a profit of 15%. Thus he gains 9% on the whole. The no. of black and white TV sets, which he has sold is :
 (a) 126 (b) 216
 (c) 135 (d) 90
39. Rakesh Yadav sells two types of Books viz. National Books and International Books. He sells National Books at Rs.18 per book and incurs a loss of 10% whereas on selling the International Books at Rs. 30 per book, he gains 20%. In what proportion should the national books and international books be mixed such that he can gain a profit of 25% by selling the combined books at Rs. 27.5 per book?
 (a) 3 : 2 (b) 2 : 3
 (c) 2 : 5 (d) 3 : 5
40. The average age of boys in class is 16.66 years, while the average age of girls is 18.75 years. Thus the average age of all the 40 students of the class is 17.5 years. If the difference between the no. of boys and girls is 8, then the no. of girls in the class is :
 (a) 12 (b) 16
 (c) 18
 (d) data insufficient
41. The ratio of water and wine in two different containers is 2 : 3 and 4 : 5. In what ratio we are required to mix the mixture of two containers in order to get the new mixture in which the ratio of wine and water be 7 : 5 ?
 (a) 7 : 3 (b) 5 : 3
 (c) 8 : 5 (d) 2 : 7
42. The average marks of the students in four sections A, B, C and D together is 60%. The average marks of the students of A, B, C and D individually are 45%, 50% 72% and 80% respectively. If the average marks of the students of section A and B together is 48% and that of the students of B and C together is 60%. What is the ratio of number of students in sections A and D ?
 (a) 2 : 3 (b) 4 : 3
 (c) 5 : 3 (d) 3 : 5
43. The diluted alcohol contains only 8 litres of alcohol and the rest is water. A new mixture in which concentration of alcohol is 30%, is to be formed by replacing diluted alcohol. How many litres of mixture shall be replaced with pure alcohol if there was initially 32 litres of water in the mixture?



- (a) 4 (b) 5
(c) 8 (d) None of these
44. The average weight of boys in a class is 30 kg and the average weight of girls in the same class is 20 kg. If the average weight of the whole class is 23.25 kg, what could be the possible strength of boys and girls respectively in the same class?
(a) 14 and 26 (b) 13 and 27
(c) 17 and 27 (d) 13 and 13
45. In a mixture of milk and water, there is only 26% water. After replacing the mixture with 7 litres of pure milk, the percentage of milk in the mixture become 76%. The quantity of mixture is :
(a) 65 litres (b) 91 litres
(c) 38 litres (d) None of these
46. The ratio of expenditure and savings is 3 : 2. If the income increases by 15% and the savings increases by 6%, then by how much per cent should his expenditure increases?
(a) 25 (b) 21
(c) 12 (d) 24
47. 4 kg of a metal contains $\frac{1}{5}$ copper and rest is iron. Another 5 kg of metal contains $\frac{1}{6}$ copper and rest is iron. The ratio of copper and iron into the mixture of these two metals:
(a) 49 : 221
(b) 39 : 231
(c) 94 : 181
(d) None of these
48. 450 litres of a mixture of milk and water contain the milk and water in the ratio 9 : 1. How much water should be added to get a new mixture containing milk and water in the ratio of 3 : 1?
(a) 54 (b) 90
(c) 45 (d) 63
49. The ratio of oil and kerosene in the container is 3 : 2 when 10 litres of the mixture is taken out and is replaced by the kerosene, the ratio becomes 2 : 3. The total quantity of the mixture in the container is :
(a) 25
(b) 30
(c) 45
(d) cannot be determined
50. From a container, 6 litres milk was drawn out and was replaced by water. Again 6 litres of mixture was drawn out & was replaced by the water in the container after these two operations the ratio of milk and water is 9 : 16. The quantity of mixture is:
(a) 15 (b) 16
(c) 25 (d) 31
51. Two types of oils having the rates of ₹ 4/kg and ₹ 5/kg respectively are mixed in order to produce a mixture having the rate of ₹ 4.60/kg. What should be the amount of the second type of oil if the amount of the first type of oil in the mixture is 40 kg?
(a) 75 kg (b) 50 kg
(c) 60 kg (d) 40 kg
52. How many kilograms of sugar worth ₹ 3.60 per kg should be mixed with 8 kg of sugar worth ₹ 4.20 per kg. such that by selling the mixture at ₹ 4.40 per kg, there may be a gain of 10%?
(a) 6 kg (b) 3 kg
(c) 2 kg (d) 4 kg
53. A mixture of 125 gallons of wine and water contains 20% wine. How much wine must be added to the mixture in order to increase the percentage of wine to 25% of the new mixture?
(a) 10 gals (b) 8.5 gals
(c) 8 gals (d) 8.33 gals
54. Rakesh Yadav lends ₹ 3600 on simple interest to Bhuvnesh for a period of 5 years. He lends a part of the amount at 4% interest and the rest at 6% and receives ₹ 960 as the amount of interest. how much money did he lend on 4% interest rate?
(a) ₹ 2800 (b) ₹ 2100
(c) ₹ 2400 (d) ₹ 1200
55. 400 students took a SSC exam in Delhi. 60% of the boys and 80% of the girls qualified the cut off in the examination. If the total percentage of students qualifying is 65%, how many girls appeared in the examination ?
(a) 100 (b) 120
(c) 150 (d) 300
56. A man purchased a book and a pen for ₹ 1300. He sold the pen at a profit of 20% and the book at a profit of 25%. In this way, his total profit was $23\frac{1}{13}\%$. Find the cost price of the book.
(a) ₹ 1100 (b) ₹ 600
(c) ₹ 500 (d) ₹ 800
57. The average salary per head of all employees of a industry is ₹ 600. The average salary of 120 officers is ₹ 4000. If the average salary per head of the rest of the employees is ₹ 560, find the total number of workers in the industry.
(a) 10200 (b) 10320
(c) 10500 (d) 10680
58. A dishonest milkman purchased milk at ₹ 10 per litre and mixed 5 litres of water in it. By selling the mixture at the rate of ₹ 10 per litre he earn a profit of 25%. The quantity of the amount of the mixture that he had was :
(a) 15 litres (b) 20 litres
(c) 25 litres (d) 30 litres
59. A cistern contains 50 litres of water. 5 litres of water is taken out of it and replaced by wine. The process is repeated again.



Find the proportion of wine and water in the resulting mixture.

- (a) 1 : 4 (b) 41 : 50
(c) 19 : 81 (d) 81 : 19

60. A container has a capacity of 20 litres and is full of spirit. 4 litres of spirit drawn out and the container is again filled with water. This process is repeated 5 times. Find out how much spirit is left in the resulting mixture finally ?

(a) $6\frac{257}{525}$ litres

(b) $6\frac{346}{625}$ litres

- (c) 6.5 litres
(d) 6.25 litres

61. A vessel is full of refined oil. $\frac{1}{4}$ of the refined oil is taken out and the vessel is filled with mustard oil. If the process is repeated 4 times and 10 litres of refined oil is finally left in the vessel, what is the capacity of the vessel?

(a) 33 litres (b) $\frac{2460}{81}$ litres

(c) $\frac{2560}{81}$ litres (d) 30 litres

62. In what ratio should two qualities of coffee powder having the rates of ₹ 47 per kg and ₹ 32 per kg be mixed in order to get a mixture that would have a rate of ₹ 37 per kg?

- (a) 1 : 2 (b) 2 : 1
(c) 1 : 3 (d) 3 : 1

63. A thief steals four pounds of liquid soap kept in a train compartment's bathroom from a container that is full of liquid soap. He then fills it with water to avoid detection. Unable to resist the temptation he steals 4 pounds of the mixture

again, and fills it with water. When the liquid soap is checked at a station it is found that the ratio of the liquid soap now left in the container to that of the water in it is 36 : 13. What was the initial amount of the liquid soap in the container if it is known that the liquid soap is neither used nor augmented by anybody else during the entire period?

- (a) 7 pounds (b) 14 pounds
(c) 21 pounds (d) 28 pounds

64. In what ratio should water be mixed with soda costing ₹ 12 per litre so as to make a profit of 25% by selling the diluted liquid at ₹ 13.75 per litre ?

- (a) 10 : 11 (b) 11 : 1
(c) 1 : 11 (d) 12 : 1

65. A sum of ₹ 36.90 is made up of 90 coins that are either 20 paise coins or 50 paise coins. Find out how many 20 paise coins are there in the total amount.

- (a) 47 (b) 43
(c) 27 (d) 63

66. A dishonest grocer professes to sell pure milk at cost price, but he mixes it with adulterated fat and thereby gains 25%. Find the percentage of adulterated fat in the mixture assuming that adulterated fat is freely available.

- (a) 20% (b) 25%
(c) 33.33% (d) 40%

67. A mixture of 70 litres of alcohol and water contains 10% of water. How much water must be added to the above mixture to make the water 12.5% of the resulting mixture?

- (a) 1 litre (b) 1.5 litre
(c) 2 litre (d) 2.5 litre

68. A mixture of 20 litres of milk and water contains 10% water. How much water should be added to it to increase the percentage of water to 25% ?

- (a) 2 litre (b) 3 litre
(c) 2.5 litre (d) 4 litre

69. A shopkeeper purchased two qualities of pulses at the rate of ₹ 200 per quintal and ₹ 260 per quintal. In 52 quintals of the second quality, how much pulse of the first quality should be mixed so that by selling the resulting mixture at ₹ 300 per quintal, he gains a profit of 25%?

- (a) 100 quintals
(b) 104 quintals
(c) 26 quintals
(d) None of these

70. A man buys milk at ₹ 8.5 per litre and dilutes it with water. He sells the mixture at the same rate and thus gains 11.11%. Find the quantity of water mixed by him in every litre of milk.

- (a) 0.111 litres
(b) 0.909 litres
(c) 0.1 litre
(d) 0.125 litres

71. There are two mixtures of milk and water, the quantity of milk in them being 25% and 75% of the mixture respectively. If 2 gallons of the first are mixed with three gallons of the second, what will be the ratio of milk to water in the new mixture?

- (a) 11 : 2 (b) 11 : 9
(c) 9 : 11 (d) 2 : 11

72. There are two kinds of alloys of tin and copper. The first alloy contains tin and copper such that 93.33% of it is tin. In the second alloy there is 86.66% tin. What weight of the first alloy should be mixed with some weight of the second alloy so as to make a 50 kg mass containing 90% of tin?

- (a) 15 kg (b) 30 kg
(c) 20 kg (d) 25 kg

73. Two containers of equal capacity are full of mixture of milk and water. In the first, the ratio of milk to water is 4 : 7 and



- in the second it is 7 : 11. Now both the mixtures are mixed in a bigger container. What is the resulting ratio of milk to water?
- (a) 149 : 247 (b) 247 : 149
(c) 143 : 241 (d) 241 : 143
74. Two vessels contain spirit and water mixed respectively in the ratio of 1 : 3 and 3 : 5. Find the ratio in which they are to be mixed to get a new mixture in which the ratio of spirit to water is 1 : 2.
- (a) 2 : 1 (b) 3 : 1
(c) 1 : 2 (d) 1 : 3
75. The price of a pen and a pencil is ₹ 35. The pen was sold at a 20% profit and the pencil at a 10% loss. If in the transaction a man gains ₹ 4, how much is cost price of the pen?
- (a) ₹ 10
(b) ₹ 25
(c) ₹ 20
(d) None of these
76. A man purchased a cupboard and a cot for ₹ 18,000. He sold the cupboard at a profit of 20% and the cot at a profit of 30%. If his total profit was 25.833%, find the cost price of the cupboard.
- (a) ₹ 10,500 (b) ₹ 12,000
(c) ₹ 7500 (d) ₹ 10,000
77. A vessel is full of a mixture of kerosene and petrol in which there is 18% kerosene. Eight litres of mixture is replaced with petrol. If the kerosene is now 15%, how much does the vessel hold?
- (a) 40 litres (b) 32 litres
(c) 36 litres (d) 48 litres
78. Two solutions of 90% and 97% purity are mixed resulting in 21 litres of mixture of 94% purity. How much is the quantity of the first solution in the resulting mixture?
- (a) 15 litres (b) 12 litres
(c) 9 litres (d) 6 litres
79. In the Delhi zoo, there are deers and ducks. If the heads are counted, there are 180, while the legs are 448. What will be the number of deers in the zoo?
- (a) 136 (b) 68
(c) 44 (d) 22
80. A bonus of ₹ 9,85,000 was divided among 300 workers of a company. Each male worker gets 5000 rupees and each female worker gets 2500 rupees. Find the number of male workers in the company.
- (a) 253 (b) 47
(c) 94 (d) 206
81. What will be the ratio of milk and water in the final solution formed by mixing milk and water that are present in three vessels of equal capacity in the ratios 4 : 1, 5 : 2 and 6 : 1 respectively?
- (a) 166 : 22
(b) 83 : 22
(c) 83 : 44
(d) None of these
82. A mixture worth ₹ 3.25 a kg is formed by mixing two types of flour, one costing ₹ 3.10 per kg while the other ₹ 3.60 per kg. In what proportion must they have been mixed?
- (a) 3 : 7 (b) 7 : 10
(c) 10 : 3 (d) 7 : 3
83. A 20 percent gain is made by selling the mixture of two types of ghee at ₹ 480 per kg. If the type costing 610 per kg was mixed with 126 kg of the other, how many kilograms of the former was mixed?
- (a) 138 kg
(b) 34.5 kg
(c) 69 kg
(d) Cannot be determined
84. In what proportion must water be mixed with milk so as to gain 20% by selling the mixture at the cost price of the milk? (Assume that water is freely available)
- (a) 1 : 4 (b) 1 : 5
(c) 1 : 6 (d) 1 : 12
85. A bartender stole beer from a bottle that contained 50% of spirit and he replaced what he had stolen with beer having 20% spirit. The bottle then contained only 25% spirit. How much of the bottle did he steal?
- (a) 80% (b) 83.33%
(c) 85.71% (d) 88.88%
86. A bag contains a total of 105 coins of ₹1, 50 p and 25 p denominations. Find the total number of coins of ₹ 1 if there are total of 50.5 rupees in the bag and it is known that the number of 25 paise coins are 133.33% more than the number of 1 rupee coins.
- (a) 56
(b) 25
(c) 24
(d) None of these
87. A person possessing ₹ 6800, lent a part of it at 10% simple interest and the remaining at 7.5% simple interest. His total income after $3\frac{1}{2}$ years was ₹ 1904. Find the sum lent at 10% rates.
- (a) ₹ 1260
(b) ₹ 1700
(c) ₹ 1360
(d) None of these
88. If a person decides to travel 80 kilometres in 8 hours partly by foot and partly on a bicycle, his speed on foot being 8 km/h and that on bicycle being 16 km/h, what distance would he travel on foot?
- (a) 20 km (b) 30 km
(c) 48 km (d) 60 km
89. Two vessels contain a mixture of milk and water. In the first vessel the ratio of milk to water is 8 : 3 and in the second vessel the ratio is 5 : 1. A 35 litre cask is filled from these vessels so as to contain a mixture of milk and water in the ratio of 4 : 1. How many litres are taken from the first vessel?
- (a) 11 litres (b) 22 litres.
(c) 16.5 litres (d) 17.5 litres



90. A shopkeeper bought one type of rice at ₹ 12 per kg and other type at ₹ 16.25 per kg. After mixing both types of rice he fixed the cost of mixture as ₹ 14.75 per kg. If the total quantity of the rice be 85 kg, find the quantity of first type of rice.
(a) 55 kg (b) 30 kg
(c) 35 kg (d) 40 kg
91. Rakesh Yadav bought two varieties of tea, first at ₹ 80 per kg and second at ₹ 120 per kg. He then mixed both varieties and sold the mixture at ₹ 121 per kg making a profit of 10%. In what ratio did Rakesh Yadav mix the two varieties of tea?
(a) 1 : 1 (b) 1 : 2
(c) 3 : 1 (d) 1 : 3
92. In a vessel there is 50 litre mixture of milk and water and their ratio in the mixture is 3 : 2 respectively. Some quantity of the mixture is taken out and the same quantity of water is added to the mixture and the ratio of milk to water becomes 12 : 13. Find the quantity of mixture taken out?
(a) 15 litres (b) 12 litres
(c) 10 litres (d) $16\frac{2}{3}$ litres
93. In a wine bottle there is 40% alcohol and the rest is water. Some quantity of the wine is taken out and is replaced with the same quantity of an another wine containing 25% alcohol. Now the bottle contains 30% alcohol. Find what part of the wine was taken out of the bottle?
(a) $\frac{1}{2}$ (b) $\frac{1}{3}$
(c) $\frac{2}{3}$ (d) $\frac{1}{4}$
94. There are three vessels of equal capacity having a mixture of milk and water in the ratio 11 : 9, 7 : 3 and 3 : 2 respectively. If all three vessels are poured into another vessel, find percentage of milk in the new mixture in comparison to the water?
(a) 160% (b) 150%
(c) 62% (d) 100%
95. In a vessel the quantity of milk was 200 litres 20 litres of the milk was taken out and was replaced with water. Again 20 litre of the mixture was taken out and replaced with water. The same procedure was repeated for the third time also. Find the ratio of the milk and water in the final mixture.
(a) 81 : 19
(b) 625 : 375
(c) 729 : 271
(d) None of these
96. In a pot the ratio of milk and water is 4 : 3 and in an another pot this ratio is 9 : 1. In what ratio should the both mixtures be mixed to get a mixture of milk and water in the ratio of 3 : 2?
(a) 2 : 3 (b) 21 : 19
(c) 21 : 2 (d) 2 : 21
97. A vessel contains some quantity of milk. 5 litre milk is taken out of this and is replaced with water. Again 5 litre of mixture is taken out and replaced with water. Now the ratio of milk and water in the vessel becomes 64 : 17. Find the quantity of milk in the vessel initially.
(a) 81 litre (b) 64 litre
(c) 45 litre (d) 40 litre
98. In an alloy there is 90% copper and 10% tin. And in the second alloy copper is 96% and tin is 4%. In what ratio these two alloys should be mixed together so that the new alloy contains 9% tin?
(a) 3 : 2 (b) 5 : 1
(c) 4 : 1 (d) 2 : 3
99. In 36 litre mixture of water and spirit, the quantity of spirit is $16\frac{2}{3}\%$. How many litres of water should be added to the mixture so that the quantity of spirit may become 10% in the mixture.
(a) 24 litre (b) 30 litre
(c) 18 litre
(d) None of these
100. In 6 litre mixture of spirit and water there is 15% water. In this mixture 4 litre of an another mixture containing 10% water is mixed. After this 1.5 litre of spirit and 0.5 litre of water is mixed in the this mixture. Find the percentage of water in the final mixture.
(a) 15% (b) 25%
(c) 20% (d) 10%
101. In a vessel a mixture contains milk, water and alcohol in the ratio 4 : 5 : 3 respectively. In an another vessel a mixture contains water and alcohol in the ratio 7 : 3. If 4 litre mixture from first vessel is mixed with 5 litre mixture from second vessel. Find the part of alcohol in the new mixture?
(a) $\frac{5}{18}$ (b) $\frac{7}{18}$
(c) $\frac{1}{3}$ (d) $\frac{13}{18}$
102. An article of jewellery of 28 grams is made up of Gold and silver. The cost of the article is ₹ 8760. If the weight of the two metals are changed with each other, the cost the article becomes ₹ 1560 less. If the cost of silver be ₹ 90 per gram, find the cost of gold per gram. Also find the weight of Gold and silver in the jewellery.
(a) ₹ 480 per gram, 16 gram, 12 gram
(b) ₹ 480 per gram, 12 gram, 16 gram
(c) ₹ 570 per gram, 16 gram, 12 gram
(d) ₹ 570 per gram, 12 gram, 16 gram



103. A milkman says that he sells the milk at cost price. But he sells milk after mixing water and so earns 25% profit. In what ratio does he mix milk and water. Also find that when he sells a litre of milk how much water is there in the milk?

- (a) 3 : 2, 400 ml
(a) 9 : 1, 100 ml
(c) 5 : 1, 200 ml
(d) 4 : 1, 200 ml

104. A vessel contains two liquids A and B in the ratio 5 : 3. If 16 litre mixture is taken out of the vessel and is replaced with liquid B, the ratio of both liquids in the vessel becomes 3 : 5. How many litre mixture was there in the vessel initially?

- (a) 100 litre (a) 64 litre
(c) 40 litre (d) 50 litre

105. The quantity of mixture of milk and water is 70 litre. This mixture contains 10% water. How many litres of water should be mixed in the mixture to make 25% water in the mixture?

- (a) 21 litre (a) 7 litre
(c) 10 litre (d) 14 litre

106. Three vessels contain water. $\frac{1}{3}$ part water of the total water of first vessel is poured into second vessel and then $\frac{1}{4}$ part of the total water of second vessel is poured into third vessel. And in the last $\frac{1}{10}$ part of the total water of third vessel is poured into first vessel. If in the last all three vessels left with 9 litres water in each, find the initial quantity of water in each vessel.

- (a) 12, 8, 7
(a) 10, 9, 7
(c) 15, 12, 10
(d) None of these

107. There are two types of steel. Type A contains 5% nickel any type B contains 40% nickel. In what ratio both types should be mixed so that in 140 tonnes of steel there is 30% nickel?

- (a) 50 tonnes A, 90 tonnes B
(b) 80 tonnes A, 60 tonnes B
(c) 40 tonnes A, 100 tonnes B
(d) 50 tonnes A, 90 tonnes B

108. A trader bought one type of tea at ₹ 75 per kg. He bought another type of tea at 90 per kg. He mixed both type of teas and sold the mixture at 100 per kg making 25% profit. In what ratio did he buy the two types?

- (a) 1 : 2 (b) 1 : 3
(c) 2 : 3 (d) 2 : 1

109. The ratio of milk and water in a vessel is 4 : 1. If 10 litre milk and 20 litre water is mixed in the vessel, the ratio of milk to water becomes 5 : 3. How many litre of milk and water was in the vessel initially?

- (a) 40 litre milk, 10 litre water
(b) 80 litre milk, 20 litre water
(c) 140 litre milk, 30 litre water
(d) 50 litre milk, 30 litre water

110. A vessel contains 80 litre mixture of milk and water in the ratio of 5 : 3. Some mixture was taken out and was replaced with water. Now the new ratio of milk to water becomes 7 : 9. How many litres of mixture was taken out of the vessel?

- (a) 30 litre (b) 20 litre
(c) 24 litre (d) 16 litre

111. In a wine bottle there is 32% spirit. Some quantity of the wine is taken out and is replaced with another type of wine which contains 18% spirit. Now the spirit in the bottle becomes 28%. Find what part of the wine was taken out?

- (a) $\frac{2}{5}$ (b) $\frac{5}{7}$
(c) $\frac{2}{7}$ (d) $\frac{5}{9}$

112. The ratio of milk and water in two vessels is 5 : 3 and 4 : 1 respectively. 20% mixture of first vessel is poured into second vessel. Now, 40% of the total mixture of second vessel is poured into first vessel. Find what is the respective ratio of milk and water in two vessels finally?

- (a) 463 : 173
(b) 87 : 41, 37 : 11
(c) 5 : 3, 4 : 1
(d) None of these

113. In three vessels the ratio of water and alcohol is 4 : 3, 5 : 2 and 7 : 4 respectively and the quantity of mixture in three vessels 21 litre, 35 litre and 44 litre respectively. If all three mixture are poured in another vessel, find what part of the alcohol will be in the whole mixture?

- (a) $\frac{7}{24}$ (b) $\frac{7}{20}$
(c) $\frac{9}{31}$ (d) None of these

114. There are three pieces of gold of the same weight having purity 22 carat, 18 carat and 12 carat respectively hall mark purity. If all three are melted and mixed together what will be the purity of thus obtained gold?

- (a) 17.50 carat
(b) 17 carat
(c) 17.3 carat
(d) None of these

115. There was 120 litre water in a bucket. 10 litre water was taken out and replaced with spirit. And again, 10 litre of mixture was taken out and replaced with 10 litre of spirit. This procedure was repeated once more. Find the respective quantity of water and spirit remained in the bucket.



- (a) 80 litre, 40 litres
(b) 90 litre, 30 litres
(c) 92.43 litre, 27.57 litres
(d) None of these
116. A vessel contains 500 litre milk. 40 litre milk was taken out and was replaced with 40 litre water. Next time 20 litre of the mixture was taken out and was replaced with 20 litre water. And in the last 10 litre mixture was taken out and replaced with 10 litre water. Find the quantity of milk remaining in the vessel.
(a) 432.76 litre
(b) 432.67 litre
(c) 410 litre
(d) None of these
117. A vessel contains some milk. 6 litre of the milk was taken out of the vessel and replaced with 6 litre of water and again 6 litre of mixture was taken out and was replaced with water. Now the ratio of milk to water becomes 100 : 69. Find the initial quantity of milk in the vessel.
(a) 28 litre (b) 26 litre
(c) 36 litre (d) 36 litre
118. A milkman sells the milk at cost price but mixes water in the milk. In this way he earns $16\frac{2}{3}\%$ profit. In what ratio does he mix milk and water?
(a) 5 : 1 (b) 7 : 1
(c) 6 : 1 (d) 3 : 10
119. A goldsmith shows three rings to his customer. The weights of three rings are 8 gram, 10 gram and 16 gram respectively and the purity of the gold in three rings being 22 ct, 20ct and 16ct respectively. The customer bought all three rings and after melting all, he made a new big ring for his girlfriend. Find the purity of gold in the ring for his girlfriend.
(a) 18.58 oct
(b) 17.98 oct
(c) 18.85 oct
(d) None of these
120. Three glass of equal capacity contains a mixture of water and alcohol in the ratio 4 : 3, 5 : 2 and 7 : 3 respectively. If the mixture of all three glasses is poured into an another fourth glass, what will be the ratio of alcohol and water in the new mixture.
(a) 61 : 139
(b) 71 : 129
(c) 71 : 139
(d) None of these
121. In a 10 litre mixture of spirit and water there is 18% spirit. In a 20 litre mixture of water and alcohol, their respective ratio is 7 : 3. In an another 18 litre mixture of sprit and alchol, spirit is $\frac{1}{3}$ part of mixture. All three mixtures are mixed together and 5 litre of the new mixture is taken out. Find what part of the separated mixture is alochol ?
(a) $\frac{5}{8}$ (b) $\frac{3}{8}$
(c) $\frac{3}{7}$ (d) $\frac{5}{7}$
122. Two bottles A and B are filled with dilute sulphuric acid (sulphuric acid + water). In bottle A, water is 40% of the acid and in bottle B, acid is 60% of the water. How much mixture should we take from each bottle respectively to make 190 litre dilute sulphuric acid containing half water and half acid?
(a) 70 litre, 120 litre
(b) 120 litre, 70 litre
(c) 150 litre, 40 litre
(d) 40 litre, 150 litre
123. Two mixtures equal in quantity contain wine, water and alcohol is the ratio of 6 : 5 : 3 and 3 : 5 : 6 respectively. From the first mixture, 20% of wine, 25% of water and 40% of alcohol is taken out and from the second mixture same percentage of three constituents is taken out. Now the remaining mixtures are added together. Find the respective ratio of wine, water and alcohol in the new mixture?
(a) 36 : 18 : 24 (b) 25 : 18 : 36
(c) 18 : 24 : 25 (d) 24 : 25 : 18
124. The cost of four different varieties of tea is ₹ 20, ₹ 30, ₹ 40 and ₹ 80 per kg respectively. If they are mixed in the ratio of 7 : 6 : 5 : 2, then at what rate should the mixture be sold to earn 15% profit?
(a) ₹ 40 per kg
(b) ₹ 38 per kg
(c) ₹ 39 per kg
(d) ₹ 39.10 per kg
125. In an alloy 80% is copper and remaining tin. In an another alloy, copper is 85% and tin is 12%. In what ratio should the two alloys be mixed so that the new mixture must have 15% tin. Also find the percentage of copper in the new mixture.
(a) 5 : 3, 80%
(b) 3 : 5, 83.21%
(c) 5 : 3, 83.12%
(d) 3 : 5, 83.12 %
126. An article of jewellery of 35 gram made up of gold and silver and cost of the article is ₹ 13440. If the weight of gold and silver is interchanged then the cost of the article becomes ₹ 9660. If the cost of gold per gram be ₹ 540, find per gram cost of silver. Also find the weight of each gold and silver in the jewellery.
(a) ₹ 120, 22 grams, 13 grams
(b) ₹ 120, 13 grams, 22 grams



- (c) ₹ 240, 11 grams, 24 grams
(d) ₹ 240, 26 grams, 9 grams
127. The capacity of three vessels is in the ratio of 6 : 4 : 3 and they contain mixtures of milk and water. The ratios of milk and water in the vessels are 3 : 1, 4 : 3 and 5 : 2 respectively. If the mixtures of all three vessels are mixed together, find the ratio of milk and water in the new mixture formed so.
(a) 15 : 19 (b) 119 : 117
(c) 125 : 57 (d) 113 : 57
128. A vessel contains 1 litre mixture of milk and water and the other vessel contains 2 litre mixture of the same. The ratio of milk and water in first and second vessels is 5 : 4 and 7 : 2 respectively. The mixture of first vessel is poured into second vessel. Now half of the mixture is poured back to first vessel. Find the ratio of milk and water in the first vessel.
(a) 8 : 11 (b) 9 : 8
(c) 19 : 8 (d) 11 : 19
129. A vessel contains 60 litre milk. 10 litre of the milk is taken out of the vessel and replaced with water. This procedure is repeated once more. Now 60 litre milk is poured into the vessel. And again 10 litre of mixture is taken out of the vessel and replaced with water. Find the ratio of milk and water in vessel finally.
(a) 71 : 93 (b) 176 : 391
(c) 671 : 319 (d) 671 : 193
130. An alloy is made up of copper, Aluminum and Tin with their respective ratio 8 : 7 : 5. An another alloy contains aluminum, Tin and iron in the ratio of 6 : 4 : 2. And third alloy contains aluminum and zinc in the ratio of 5 : 3. If all three alloys are melted together (taking same weight of each), find the percentage of Aluminum in the new alloy.
(a) 49.71% (b) 42.17%
(c) 42.71% (d) 49.17%
131. An article is made of two metals and its weight is 150 gram and the cost of the article is 570. If the weight of two metals in the article is changed with each other the cost of the article becomes 480. If per gram cost of metals is in the ratio 4 : 3, find the weight of each metal.
(a) 30 gram, 120 gram
(b) 100 gram, 50 gram
(c) 50 gram, 100 gram
(d) 120 gram, 30 gram
132. In a mixture the ratio of water and milk is 7 : 5. 24 litre of the mixture is taken out and is replaced with water. Now the new ratio of milk and water becomes 1 : 3. Find the initial quantity of the mixture.
(a) 50 litre (b) 48 litre
(c) 60 litre (d) 56 litre
133. In a vessel the ratio of milk and water is 5 : 4 and the total quantity of mixture is 81 litre. How many litres of water should be added to the mixture so that the ratio of milk and water may become 4 : 5?
(a) $20\frac{1}{4}$ litre
(b) $20\frac{1}{2}$ litre
(c) 20 litre
(d) can't be determined
134. In first type of 10 litre wine alcohol is 26% while in second type of 15 litre wine, alcohol is 45%. If both types of wines are mixed together what will be the percentage of alcohol in the mixture?
(a) 38% (b) 37.4%
(c) 34.7% (d) None of these
135. In a vessel the ratio of milk and water is 4 : 5. 18 litre mixture was taken out and replaced with 16 litre water. In this way the ratio of milk and water becomes 4 : 7. Find the initial quantity of mixture.
(a) 80 litre
(b) 100 litre
(c) 90 litre
(d) None of these
136. In three alloys A, B and C the percentage of copper is 80%, 75% and 70% respectively and the percentage of tin is 15%, 15% and 25% respectively and the remaining is nickel. If 10 kg, 15 kg and 50 kg of the three alloys be mixed together, find the ratio of copper, tin and nickel in the mixture thus obtained.
(a) 127 : 65 : 18
(b) 217 : 56 : 18
(c) 217 : 65 : 18
(d) 217 : 65 : 81
137. Three vessel contain different quantity of milk $\frac{1}{4}$ part of milk from vessel A is poured into vessel B. Now $\frac{1}{3}$ part of total milk from vessel B is poured into vessel C. Again $\frac{5}{11}$ part of the total milk from vessel C is poured into vessel A. And in the last $\frac{1}{4}$ part of total milk from A is poured into vessel B. In this way each vessel contains 6 litre milk, find the initial quantity of milk in each vessel.
(a) 4 litre, 6 litre, 9 litre
(b) 4 litre, 5 litre, 9 litre
(c) 4 litre, 5 litre, 6 litre
(d) 4 litre, 8 litre, 10 litre
138. Two canes A and B contains mixture of milk and water in the ratio of 4 : 1 and 5 : 2 respectively. In what ratio the mixture of two canes should be mixed to get a mixture of milk and water in the ratio 7 : 2?



- (a) 20 : 7 (b) 5 : 2
(c) 15 : 7 (d) 9 : 5
139. In a 729 ml mixture of milk and water their respective ratio is 7 : 2. How much water should be mixed to the mixture to make the ratio 7 : 3?
- (a) 61 ml (b) 90 ml
(c) 70 ml (d) 81 ml
140. Four vessels contains the mixture of milk and water the ratio of milk and water in the vessels is 5 : 3, 2 : 1, 3 : 2, and 7 : 4 respectively. In which vessel, milk is the least in comparison with water.
- (a) First (b) Second
(c) Third (d) Fourth
141. Milk and water are mixed in a glass in the ratio of 3 : 5 and in another glass this ratio is 6 : 1 in what ratio should the mixture of both glasses be mixed to get a new mixture with ratio of milk and water 1 : 1?
- (a) 20 : 7 (b) 8 : 3
(c) 27 : 4 (d) 25 : 9
142. Two vessels of same capacity contains a mixture of water and milk. The ratio of water and milk in the two vessels is 3 : 4 and 5 : 3 respectively. If the mixture of two vessels is poured into a third vessel. Find the new ratio of water and milk in the new mixture?
- (a) 15 : 12 (b) 53 : 59
(c) 20 : 9 (d) 59 : 53
143. A vessel contains a liquid in which there is 5 part milk and 3 part water. What part of the mixture should be taken out and replaced with water so that the ratio of milk and water may become 1 : 1?
- (a) $\frac{2}{5}$ (b) $\frac{1}{3}$
(c) $\frac{1}{4}$ (d) $\frac{1}{5}$
144. In a bottle the ratio of wine and water is 3 : 1. What part of the mixture should be taken out and replaced with water so that the new ratio of wine and water may become 1 : 1?
- (a) $\frac{1}{4}$ (b) $\frac{1}{3}$
(c) $\frac{3}{4}$ (d) $\frac{2}{3}$
145. In a mixture the ratio of acid and water is 1 : 3. If 5 litre acid is added to the mixture the ratio becomes 1 : 2. Find the initial quantity of the mixture.
- (a) 32 litre (b) 40 litre
(c) 42 litre (d) 45 litre
146. In a sample of 50 litre glycerine there was 20% impurity. How many litres pure glycerine should be added to the mixture so that the impurity may reduce to 5%?
- (a) 155 litre (b) 150 litre
(c) 150.4 litre (d) 149 litre
147. In a vessel two medicine A and B are in the ratio of 4 : 1. 10 litre of mixture is taken out and replaced with 10 litres of medicine B. and the ratio of A and B thus becomes 2 : 3. Find the initial quantity of medicine A.
- (a) 4 litre (b) 8 litre
(c) 16 litre (d) 32 litre
148. A milkman says that he sells milk at cost price but he makes $16\frac{2}{3}\%$ profit by mixing water to milk. If he sells 14 litre (mixture) milk, find the quantity of water in the mixture.
- (a) 6 litre (b) 2 litre
(c) 3 litre (d) 5 litre
149. In a 40 litre mixture of milk and water their respective ratio is 7 : 1. To make the ratio 3 : 1 how many litres water should be added to the mixture?
- (a) 6 (b) $6\frac{1}{2}$
(c) $6\frac{2}{3}$ (d) $6\frac{1}{3}$
150. In an alloy the ratio of zinc, copper and Tin is 2 : 3 : 1 and in another alloy the ratio of copper Tin and lead is 5 : 4 : 3. If taking equal weight of two alloys are mixed together, find the weight of lead in a kg of new alloy.
- (a) $\frac{1}{2}$ kg (b) $\frac{1}{8}$ kg
(c) $\frac{3}{14}$ kg (d) $\frac{7}{9}$ kg
151. In 700 ml solution of 18% alcohol, how much quantity of pure alcohol is to be added so that the new solution contains 30% alcohol.
- (a) 140 ml (b) 120 ml
(c) 50 ml (d) 100 ml
152. A tank was full of pure milk half of milk was sold and then the tank was filled with water fully. Again half of milk (mixture) was sold and the tank was filled with water and now for the third time half of milk was sold and tank was filled with water. In the last what will be the percentage of milk?
- (a) 12.5% (b) 40%
(c) 33.5% (d) 37.5%
153. In the mixture of 48 litre the ratio of milk to water is 5 : 3. How many litres water should be added to the mixture so that the ratio of milk and water may reverse?
- (a) 32 litre (b) 24 litre
(c) 40 litre (d) 50 litre
154. If 4 litre water is evaporated from 12 litre solution of 7% acid, then find the percentage of acid in the new solution.
- (a) 10.5% (b) 11.7%
(c) 12% (d) 13%



155. In 80 litre mixture of milk and water the ratio of milk and water is 3 : 2. How many litres milk should be added to the mixture so that milk may become double of the water.

- (a) 16 litre (b) 12 litre
(c) 20 litre (d) 14 litre

156. In some quantity of pure milk costs 3 Rs. per litre 4 litre water is mixed. The milkman sold the mixture at the cost price and earned 20% Profit. Find the quantity of pure milk in the mixture sold.

- (a) 20 litres (b) 25 litres
(c) 30 litres (d) 18 litres

157. The percentage of sugar in the first solution is 15% while in the second it is 5%. How many litres of the second solution should be mixed with 20 litre of first solution so that the new solution so obtained contains 10% sugar.

- (a) 10 (b) 15
(c) 5 (d) 20



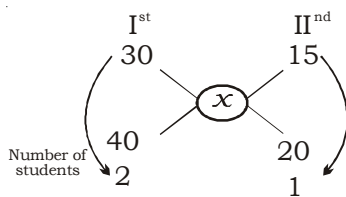
ANSWER KEY

1. (b)	17. (d)	33. (b)	49. (b)	65. (c)	81. (b)	97. (c)	113. (d)	129. (d)	145. (b)
2. (a)	18. (a)	34. (b)	50. (a)	66. (a)	82. (d)	98. (b)	114. (c)	130. (d)	146. (b)
3. (b)	19. (b)	35. (d)	51. (c)	67. (c)	83. (d)	99. (a)	115. (c)	131. (d)	147. (c)
4. (a)	20. (d)	36. (a)	52. (d)	68. (d)	84. (b)	100. (a)	116. (a)	132. (c)	148. (b)
5. (b)	21. (b)	37. (b)	53. (d)	69. (c)	85. (b)	101. (a)	117. (b)	133. (a)	149. (c)
6. (a)	22. (c)	38. (d)	54. (d)	70. (a)	86. (c)	102. (b)	118. (c)	134. (b)	150. (b)
7. (b)	23. (d)	39. (a)	55. (a)	71. (b)	87. (c)	103. (d)	119. (a)	135. (c)	151. (b)
8. (c)	24. (a)	40. (b)	56. (d)	72. (d)	88. (c)	104. (c)	120. (c)	136. (c)	152. (a)
9. (b)	25. (c)	41. (b)	57. (b)	73. (a)	89. (a)	105. (d)	121. (b)	137. (b)	153. (a)
10. (*)	26. (a)	42. (b)	58. (c)	74. (c)	90. (b)	106. (a)	122. (a)	138. (a)	154. (b)
11. (c)	27. (c)	43. (b)	59. (c)	75. (b)	91. (d)	107. (c)	123. (d)	139. (b)	155. (a)
12. (c)	28. (d)	44. (b)	60. (b)	76. (c)	92. (c)	118. (d)	124. (d)	140. (c)	156. (a)
13. (b)	29. (c)	45. (b)	61. (c)	77. (d)	93. (c)	119. (a)	125. (d)	141. (a)	157. (d)
14. (b)	30. (b)	46. (b)	62. (a)	78. (c)	94. (a)	110. (c)	126. (a)	142. (d)	
15. (a)	31. (a)	47. (a)	63. (d)	79. (c)	95. (c)	111. (c)	127. (c)	143. (b)	
16. (c)	32. (b)	48. (b)	64. (c)	80. (c)	96. (c)	112. (b)	128. (c)	144. (b)	

Solution

1. (b) Average weight of 40 students = 30
 Total weight = $40 \times 30 = 1200$
 Average weight of 20 students = 15
 Total weight = $20 \times 15 = 300$
 Average weight = $\frac{(1200 + 300)}{(40 + 20)} = \frac{1500}{60} = 25$

Alternatively (1) :

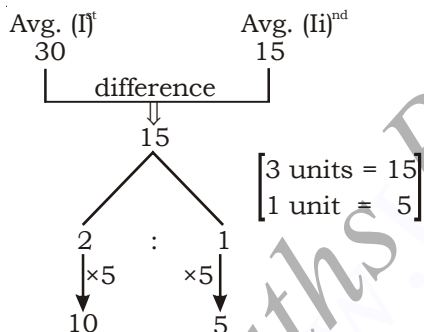


Required avg. (x)

$$= \frac{30 \times 2 + 15 \times 1}{(2 + 1)} = \frac{75}{3} = 25$$

Alternatively (2) :

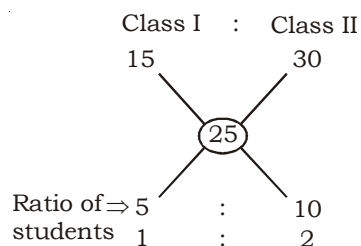
Note : To save your valuable time try to understand the below given method.



The average of the class will lie in between 15 to 30.

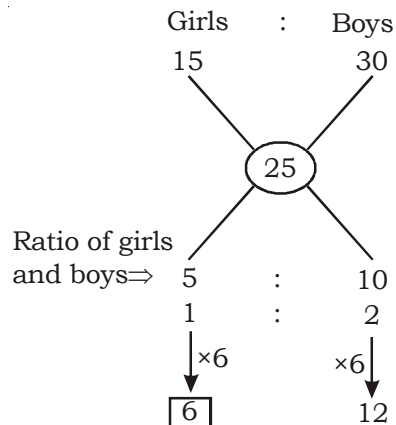
Average of the class = $(15 + 10) = 25$
 or Average of the class = $(30 - 5) = 25$

2. (a) By alligation Rule



Ratio of $\Rightarrow 5 : 10$
 students $1 : 2$

3. (b) By Alligation method,

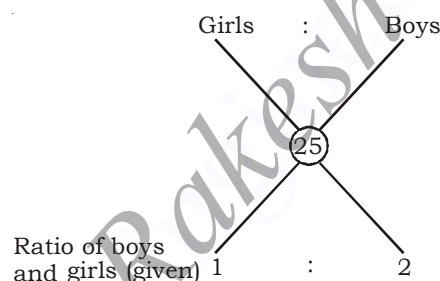


Ratio of girls and boys $\Rightarrow 5 : 10$
 $1 : 2$

Required number of girls = 6

4. (a) Let the average weight of girls = x

By alligation method,



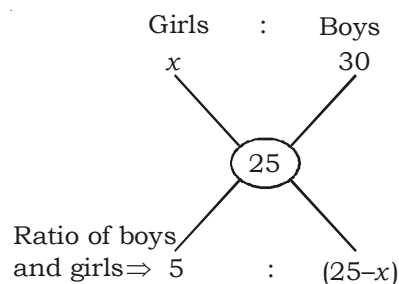
Ratio of boys and girls (given) 1 :

$$\frac{x \times 1 + 30 \times 2}{(1 + 2)} = 25$$

$$\Rightarrow x + 60 = 75$$

$$x = 15 \text{ kg}$$

Alternatively:-



Ratio of boys and girls $\Rightarrow 5 : 10$
 $1 : 2$

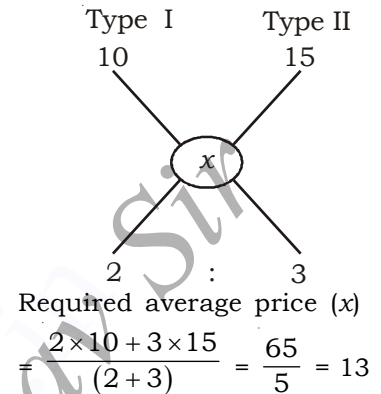
According to the question,

$$\frac{5}{(25 - x)} = \frac{1}{2}$$

$$\Rightarrow 10 = 25 - x$$

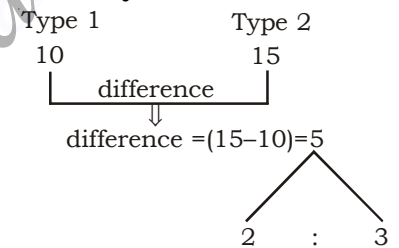
$$\Rightarrow x = 15 \text{ kg}$$

5. (b) By alligation method,



$$\text{Required average price (x)} = \frac{2 \times 10 + 3 \times 15}{(2 + 3)} = \frac{65}{5} = 13$$

Alternatively:-



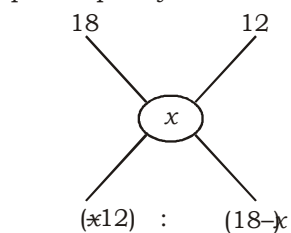
$$\text{Ist part} = \frac{5}{(2 + 3)} \times 2 = 2$$

$$\text{IInd part} = \frac{5}{(2 + 3)} \times 3 = 3$$

$$\text{Required average} = (10 + 3) = 13$$

$$\text{or required average} = (15 - 2) = 13$$

6. (a) By alligation Method,
 Superior quality Inferior quality



According to the question,

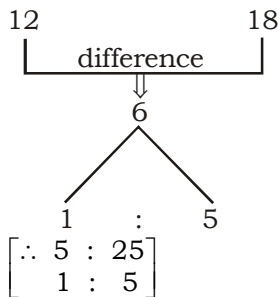
$$\frac{(x - 12)}{(18 - x)} = \frac{5}{25}$$

$$\frac{(x - 12)}{(18 - x)} = \frac{1}{5}$$

$$\Rightarrow 5x - 60 = 18 - x$$

$$\Rightarrow 6x = 60 + 18$$

$$x = \frac{78}{6} = 13$$

Alternatively:-

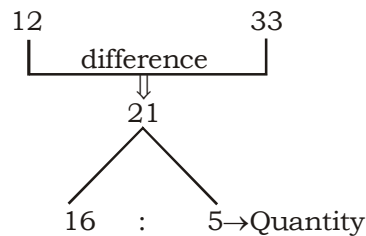
$$\text{I}^{\text{st}} \text{ part} = \frac{6}{(1+5)} \times 1 = 1$$

$$\text{II}^{\text{nd}} \text{ part} = \frac{6}{(1+5)} \times 5 = 5$$

$$\text{Required average} = (12 + 1) = 13$$

$$\text{or Required average} = (18 - 5) = 13$$

7. (b) By alligation method,



$$\text{I}^{\text{st}} \text{ part} = \frac{21}{(16+5)} \times 16 = 16$$

$$\text{II}^{\text{nd}} \text{ part} = \frac{21}{(16+5)} \times 5 = 5$$

Note : The average price will lie between 12 and 33

$$\therefore \text{Required average price} = (12 + 5) = \text{Rs. } 17$$

$$\text{or required average price} = (33 - 16) = \text{Rs. } 17$$

Alternate:-

By avg. method

Total Price of wine

$$\Rightarrow 16 \times 12 = 192$$

Total Price of water

$$\Rightarrow 5 \times 33 = 165$$

Avg. Price

$$\Rightarrow \frac{192+165}{16+5} = \frac{357}{21} = 17$$

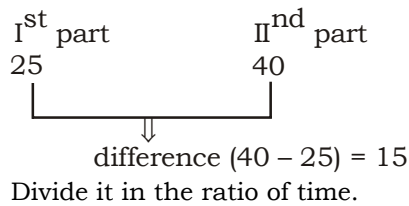
8. (c)

Average Speed = $\frac{\text{Total distance}}{\text{Total time}}$

Required average speed

$$= \frac{25 \times \frac{1}{2} + 40 \times \frac{1}{3}}{\frac{5}{6}} = \frac{75 + 80}{5}$$

$$= \frac{155}{5} = 31 \text{ km/h}$$

Alternatively:-

$$\text{I}^{\text{st}} \text{ part} = \frac{15}{(3+2)} \times 3 = 9 \text{ km/h}$$

$$\text{II}^{\text{nd}} \text{ part} = \frac{15}{(3+2)} \times 2 = 6 \text{ km/h}$$

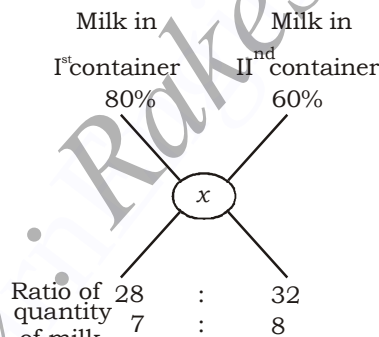
Required average speed

$$= (25 + 6) = 31 \text{ km/h}$$

or Required average speed

$$= (40 - 9) = 31 \text{ km/h}$$

9. (b) By alligation Method,

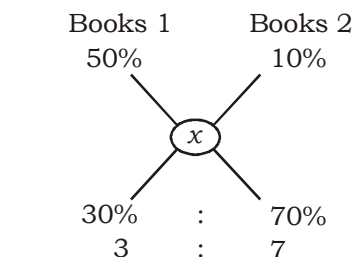


Required % of milk in the new mixture

$$= \frac{80 \times 7 + 60 \times 8}{15} = \frac{560 + 480}{15}$$

$$= \frac{1040}{15} = 69.33\%$$

10. By Alligation method,



Required average profit percent

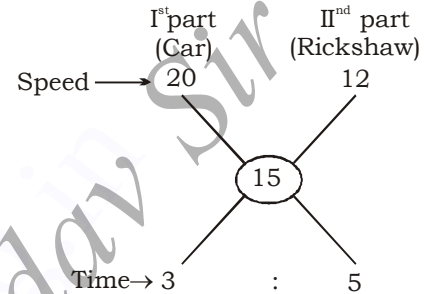
$$= \frac{50 \times 3 + 7 \times 10}{(3+7)} = \frac{220}{10} = 22\%$$

11. (c) Average speed of Bhuvnesh

$$= \frac{\text{distance}}{\text{time}}$$

$$= \frac{150}{10} = 15 \text{ km/hr}$$

Now by alligation Method,



Time for travelling by Car

$$= \frac{10}{(3+5)} \times 3 = \frac{15}{4} \text{ hours}$$

Time for travelling by Rickshaw

$$= \frac{10}{(3+5)} \times 5 = \frac{25}{4} \text{ hours}$$

Distance travelled by Car

$$= 20 \times \frac{15}{4} = 75 \text{ km}$$

Distance travelled by Rickshaw

$$= 12 \times \frac{25}{4} = 75 \text{ km}$$

Ratio of distances = 75 : 75 = 1 : 1

Note: We can save our time in such type of questions, not to calculate actual distance and actual time, If in question examiner is asking about ratio of distances.

$$\frac{\text{Distance travelled by car}}{\text{Distance travelled by Rickshaw}}$$

$$= \frac{20 \times 3}{12 \times 5} = \frac{1}{1}$$

Required ratio = 1 : 1

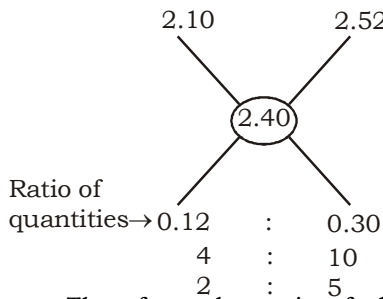
12. (c) sp of sugar = Rs. 3/kg

Profit = 25%

$$\therefore \text{CP of sugar} = \frac{3}{(100 + 25)} \times 100$$

$$= \frac{300}{125} = \frac{12}{5} = ₹ 2.4/\text{kg}$$

Now by alligation Method,



Therefore, the ratio of cheaper and costlier sugar is 2 : 5.

13. (b) **Note** : In such type of questions save your valuable time to think like that, water is freely available and all the water is sold at the price of milk, then the water gives the profit on cost of milk.

$$\therefore \text{profit percentage} = \frac{5}{20} \times 100 = 25\%$$

Note: These type of questions are similar to

SP of 20 articles = CP of 25 articles

$$\text{Hence, Profit \%} = \frac{5}{20} \times 100 = 25\%$$

14. (b) $33.33\% = \frac{1 \rightarrow \text{water}}{3 \rightarrow \text{soda}}$

for 33.33 % profit,

required units of water = 1

required units of soda = 3

Ratio of water : Soda = 1 : 3

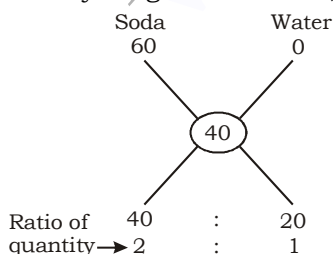
Note : For detailed method of such type of questions refer solutions of earlier questions of same type.

15. (a) Selling price of mixture = 50/litres

profit % = 25%

$$\therefore \text{Cost price of mixture} = \frac{50}{125} \times 100 = \text{Rs.} 40/\text{litres}$$

Now by alligation method,



Ratio of water and Soda = 1 : 2

16. (c) $80\% = \frac{4 \rightarrow \text{quantity of milk}}{5 \rightarrow \text{total mixture}}$
 $\therefore$ quantity of water = $(5 - 4) = 1$

Now similarly $50\% = \frac{1}{2}$

Milk : Water
 $4 : 1$
 $1 \times 4 : 1 \times 4$

Note : In this process quantity of milk remains constant because the quantity of water is added.

Now ratio of milk to water

Milk : Water
 $4 : 1 \xrightarrow{+3} 5$
 $4 : 4$

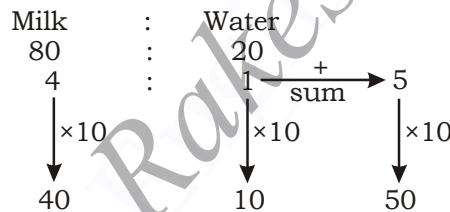
According to the question,

5 units = 50 litres

1 unit = 10 litres

3 units = $10 \times 3 = 30$ litres

17. (d) Total quantity of mixture = 50 litres



Quantity of milk taken out
 $= \frac{10}{(4+1)} \times 4 = 8$ litres
 Quantity of water taken out
 $= \frac{10}{(4+1)} \times 1 = 2$ litres

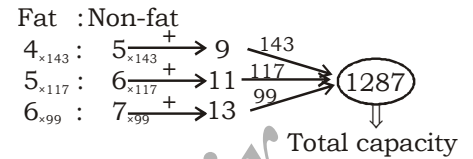
Now remaining quantity of milk and water in mixture.

Milk : Water
 $32 : 8 \xrightarrow{+10} 18$

Required percentage of water

$$= \frac{18}{(32+18)} \times 100 = 36\%$$

18. (a)

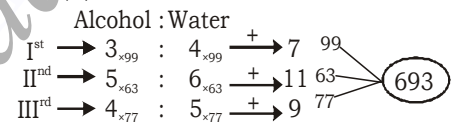


Note : Quantity of all three types of butter is equal in the mixture.

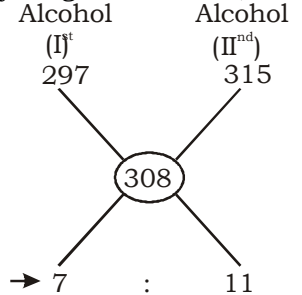
$\therefore$ New ratio,

Fat : Non-fat
 Pages $\rightarrow 572 : 715$
 Amul $\rightarrow 585 : 702$
 Nestle $\rightarrow 594 : 693$
 $1751 : 2110$

19. (b)



Now by Alligation Method,



Hence, the ratio of first mixture is to second mixture is 7 : 11.

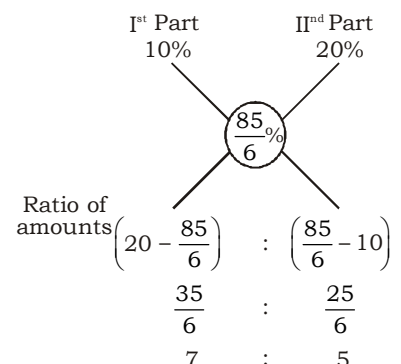
$\therefore$ Required first type alcohol

$$= \frac{18}{(7+11)} \times 7 = 7$$

20. (d) Total interest = Rs. 3400

Average rate of interest

$$= \frac{3400}{6000} \times \frac{100}{4} = \frac{85}{6} \%$$



Amount lent on 10%

$$= \frac{6000}{(7+5)} \times 7 = \text{Rs. 3500}$$

21. (b) **Note** → In such type of questions use the below given formula.

$$\text{Final} = \text{initial} \left(1 - \frac{x}{m}\right)^n$$

where x = amount being replaced in each operation.

m = total amount

$$\text{Final} = 50 \left(1 - \frac{5}{50}\right)^3$$

n = Who many times

Final Quantity of milk

$$= 50 \times \frac{9}{10} \times \frac{9}{10} \times \frac{9}{10} = \text{36.45 Litres}$$

Alternate:-

$$\frac{5}{50} = \frac{1}{10}$$

Initial	Final
10	9
10	9
10	9
1000	729

1000 units = 50 litres

$$1 \text{ unit} = \frac{50}{1000} \text{ litres}$$

$$= 729 \text{ units} = \frac{50}{1000} \times 729 = \text{36.45 litres}$$

22. (c) Part to be taken out

$$= \frac{40}{200} = \frac{1}{5}$$

Initial	Final
5	4
5	4
5	4
5	4
625	256

625 units = 200 litres

$$1 = \frac{200}{625} \text{ litres}$$

$$369 \text{ units} = \frac{200}{625} \times 369$$

$$= \text{118.08 litres}$$

23. (d)

Final Quantity (Beer)	:	Final Quantity (Water)
343		169

Note → In starting the container was full of beer.

$$\text{Initial Quantity} = (169 + 343) = 512$$

Now by using formula,

$$\Rightarrow 343 = 512 \left(1 - \frac{15}{m}\right)^3$$

$$\Rightarrow \frac{343}{512} = \left(1 - \frac{15}{m}\right)^3$$

$$\Rightarrow \left(\frac{7}{8}\right)^3 = \left(1 - \frac{15}{m}\right)^3$$

$$\Rightarrow \frac{7}{8} = \left(1 - \frac{15}{m}\right)$$

$$\Rightarrow m = 120$$

$\therefore$ initial amount of beer = **120 litres**

Alternate →

Note: In such type of questions follow the given below method to save your valuable time.

Initial quantity

$$= (343 + 169) = 512$$

Final quantity = 343

Initial : Final

$$^3\sqrt{512} : ^3\sqrt{343}$$

$$8 : 7$$

1 unit

1 unit = 15 litres

$$8 \text{ units} = 15 \times 8 = \text{120 litres}$$

24. (a) $20\% = \frac{1}{5}$

Let the initial quantity of milk is jar = x gm

$$512 = x \left(1 - \frac{1}{5}\right)^4$$

$$512 = x \times \left(\frac{4}{5}\right)^4$$

$$x = \frac{512 \times 625}{256} = 1250 \text{ gm}$$

$$x = 1.25 \text{ kg.}$$

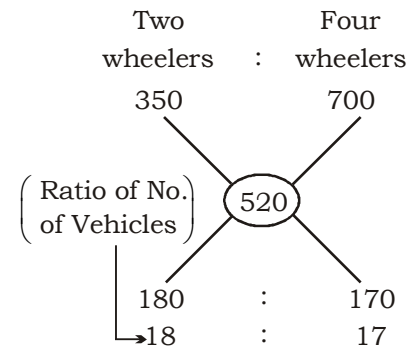
Alternate → **Note** → To save your valuable time follow the give below method.

Initial	Final
5	4
5	4
5	4
5	4
625	256
$\downarrow \times 2$	$\downarrow \times 2$
1250 gm	512 gm

Quantity of milk in the jar initially was = 1250 gm = **1.25 kg**

25. (c) By alligation Method,

Note → For detailed solution follow earlier question of same type.



Total number of two wheelers

$$= \frac{175}{(18+17)} \times 18 = \text{90}$$

Alternate:-

In these type of questions, Assume all vehicles be two wheelers

So, No. of wheels

$$\Rightarrow 175 \times 2 = 350$$

No. of extra wheels

$$\Rightarrow 520 - 350 = 170$$

These extra wheels are of four wheelers.

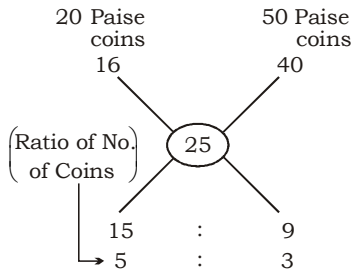
$\therefore$ No. of Four wheelers

$$\Rightarrow \frac{170}{2(\text{Extra wheels of four wheelers})} = 85$$

No. of Two wheelers

$$= 175 - 85 = 90$$

26. (a) By Alligation Method,



Required number of 50 paise

$$= \frac{80}{(5+3)} \times 3 = 30$$

Alternate:-As per previous question,
Assume all coins be 20 paise coins

Total no. of coins = 80

Hence, we have 80×20 $= 1600$ paise or 16 Rs. Extra Rupees $\Rightarrow 25 - 16 = 9$ Rs. or 900 paise

These extra 9 Rs. are due to 50 paise coin

Extra paise in 50 Rs. coin = 50 P - 20 P = 30 paise

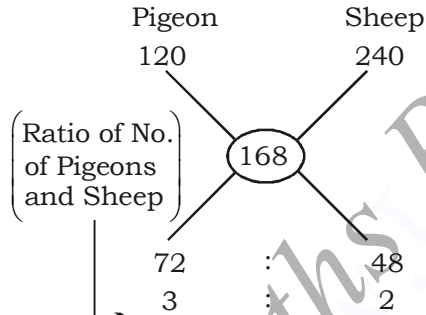
No. of 50 paise coin

$$\Rightarrow \frac{900[\text{Extra Rs.}]}{30[\text{Extra Paise}]} = 30$$

No. of 20 paise coin

 $\Rightarrow 80 - 30 = 50$.

27. (c) By alligation rule,



Required number of sheep

$$= \frac{60}{(3+2)} \times 2 = 24$$

Alternate →**Note:-** In such type of question to save your valuable time we can take help from options and then satisfy the question condition.**Option (c) →** Number of Sheep = 24 $\therefore$ Number of Pigeons = $(60 - 24) = 36$ Number of legs = $24 \times 4 + 36 \times 2$
 $= 96 + 72 = 168$

The same data is mention in question. So option (c) is correct.

28. (d) Ratio of Soda : Water = 4 : 1

$$\text{Quantity of Soda} = \frac{75}{(4+1)} \times 4 = 60$$

$$\text{Quantity of Water} = \frac{75}{(4+1)} \times 1$$

 $= 15$ Let the required quantity of water = x litre

$$\frac{60}{15+x} = \frac{3}{1} \Rightarrow 60 = 45 + 3x$$

$$3x = 15 \Rightarrow x = \frac{15}{3} = 5 \text{ litres}$$

Alternate:-**Note:-** In such type of questions follow the given below method to save your valuable time.

Soda : Water

$$4_{\times 3} : 1_{\times 3}$$

$$3_{\times 4} : 1_{\times 4}$$

The quantity of soda is constant because we added water into the mixture.

After that new ratio,

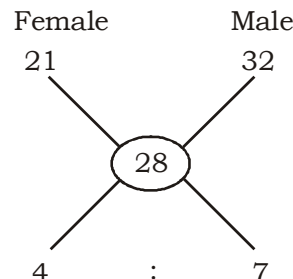
$$\begin{array}{ccc} \text{Soda} & : & \text{Water} \\ 12 & : & 3 \xrightarrow{+1} 15 \\ 12 & : & 4 \xleftarrow{+1} \end{array}$$

15 units = 75 litres

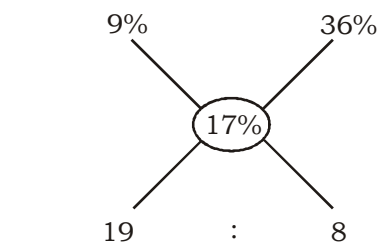
1 unit = 5 litres

Required quantity of water = 5 litres

29. (c) By alligation Method,

Total number of employees would be the multiple of $(4 + 7)$
 $= 11$ $\therefore$ Hence option (c) is correct.

30. (b) By alligation Method,

 $(19 + 8) \text{ units} = 108$ $27 \text{ units} = 108$

$$1 \text{ unit} = \frac{108}{27} = 4$$

8 units = $4 \times 8 = 32$

Required no. of buses sold at 36% profit = 32.

31. (a) According to the question,

Boys : Girls

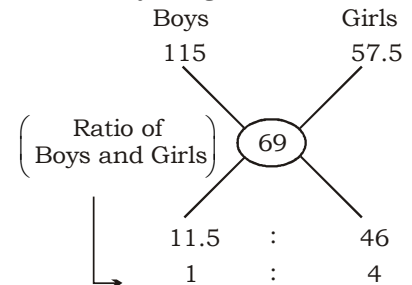
$$2x : x$$

$$(2x - x) = 50 \text{ paise}$$

$$x = 50 \text{ paise}$$

$$2x = 100 \text{ paise}$$

Now By alligation method,



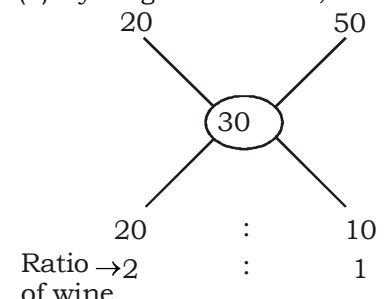
Required number of girls

$$= \frac{115}{(1+4)} \times 4 = 92$$

32. (b) Profit =
- $12.5\% = \frac{1}{8}$

Note:- Water is freely available, so to gain 12.5% ratio of water : milk = 1 : 8**Note:-** In these type of question, convert percentage into the ratio. That will be the answer.

33. (b) By Alligation Method,

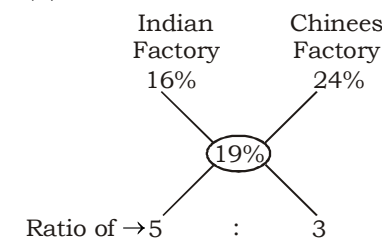


Since the ratio of 20% wine to 50% wine is 2 : 1, it means there

is $\frac{2}{3}$ wine is replaced with wine in which the strength of spirit is 20%.

So we can say he stole $\frac{2}{3}$ rd of the original wine.

34. (b)



Cost Prices
Cost price of indian factory

$$= \frac{72}{(5+3)} \times 5 = 45 \text{ Crore}$$

$$\text{Selling price} = 45 \times \frac{(100+16)}{100}$$

$$= \frac{45 \times 116}{100} = \mathbf{52.20 \text{ crore}}$$

35. (d) $\therefore 20\% = \frac{1}{5}$

Water : Milk

Ratio initially 1 : 4

Ratio after $9_{\times 4}$: $1_{\times 4}$
mixing water

Note: The quantity of milk would be constant because we added up quantity of water.

After that new ratio,

$$\begin{array}{ccc} \text{Water} & : & \text{Milk} \\ 1 & : & 4 \end{array} \xrightarrow{\text{sum}} 5$$

$$\begin{array}{ccc} 35 \curvearrowleft & 36 & : & 4 \end{array}$$

$$5 \text{ units} = 25 \text{ litres}$$

$$1 \text{ unit} = \frac{25}{5} \text{ litres}$$

$$35 \text{ units} = 5 \times 35 = 175 \text{ litres}$$

Alternate $\rightarrow$

Initially quantity of water

$$= \frac{25 \times 20}{100} = 5 \text{ litres}$$

$$\therefore \text{Quantity of milk} = (25 - 5) = 20 \text{ litres}$$

Let required capacity of water
= x litres

$\therefore$ According to the question,

$$\Rightarrow \frac{5+x}{20} = \frac{90}{10} \Rightarrow 5+x = 180$$

$$\Rightarrow x = \mathbf{175 \text{ litres}}$$

36. (a) $9.09\% = 9\frac{1}{11}$

$$= \frac{1 \rightarrow \text{Water}}{11 \rightarrow \text{Milk}}$$

Ratio of water : Milk = 1 : 11

Ratio of water : Mixture

$$= 1 : 12 \quad (1+11)$$

$$\therefore 1 \text{ litres} = 1000 \text{ ml}$$

Thus the quantity of water in the mixture of 1 litre mixture

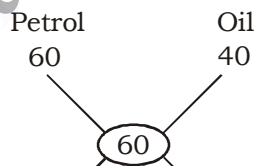
$$= \frac{1000}{12} \times 1 = \mathbf{83.33 \text{ mL}}$$

37. (d) Profit % = 25%

$$= \frac{1 \rightarrow \text{Profit}}{4 \rightarrow \text{CP}}$$

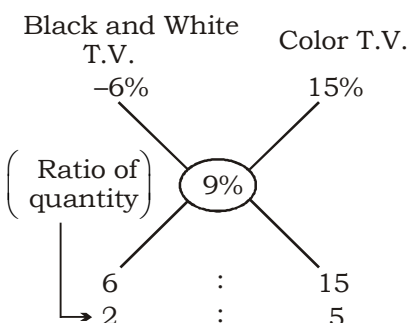
$$\text{Selling price} = \text{Rs. } 75$$

$$\text{Cost price} = 75 \times \frac{4}{5} = \text{Rs. } 60$$



Now we know that if we mix oil (worth Rs. 40 per litres) with petrol (worth Rs. 60 per litres), the cost price of the mixture must be less than Rs. 60 per litres, which is impossible.

38. (d) By alligation Method,



According to the question,

$$(2+5) \text{ units} = 315$$

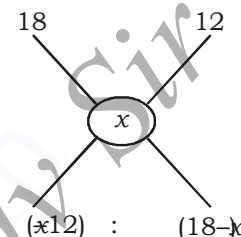
$$7 \text{ units} = 315$$

$$1 \text{ unit} = 45$$

Total number of black and white

$$\text{T.V. Sets} = 45 \times 2 = \mathbf{90}$$

Superior quality Inferior quality



39. (a) Selling price of the combined books = Rs. 27.5

$$\text{Profit} = 25\% = \frac{1 \rightarrow \text{Profit}}{4 \rightarrow \text{CP}}$$

$$\text{Cost price} = \frac{27.5}{5} \times 4 = \text{Rs. } 22$$

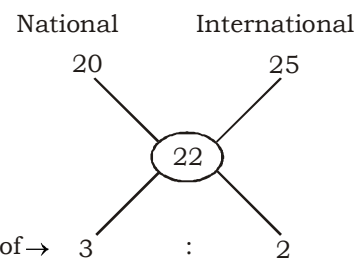
The SP of national book = Rs. 18

$$\therefore \text{CP} = \frac{18}{(100-10)} \times 100 = \text{Rs. } 20$$

The SP of international book = Rs. 30

$$\therefore \text{CP} = \frac{30}{(100-20)} \times 100 = \text{Rs. } 25$$

Now by alligation Method,



Ratio of $\rightarrow$ 3 : 2
National
& International book

$\therefore$ Ratio of National : International books = 3 : 2

40. (b) Average age boys = 16.66

$$= 16\frac{2}{3} = \frac{50}{3} \text{ years}$$

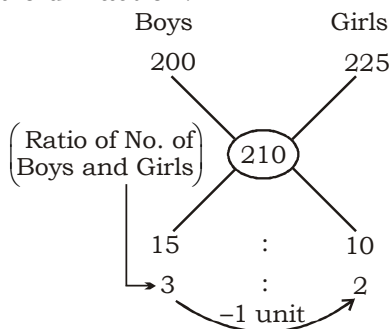
Average age of girls = 18.75

$$= \frac{75}{4} \text{ years}$$

Average age of the class

$$= 17.5 = \frac{35}{2} \text{ years}$$

Note:- Multiply by 12 in all values of average ages to avoid fraction.



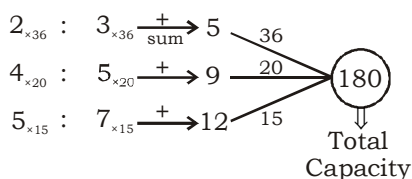
$$1 \text{ unit} = 8$$

$$2 \text{ units} = 16$$

Required number of girls = **6 years**

41. (b)

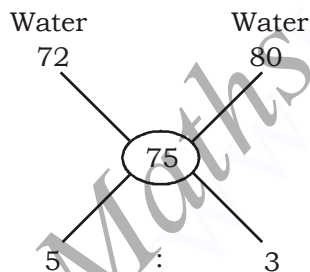
Water : Wine



After equating the capacity of containers New ratio of water and wine

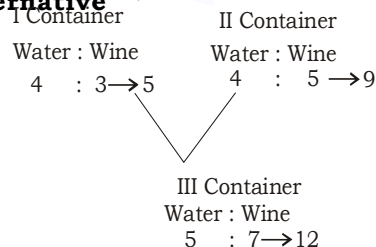
Water	:	Wine
72	:	108
80	:	100
75	:	105

Now By Alligation Method,

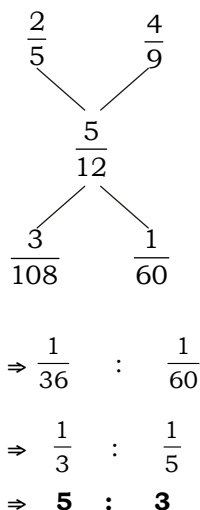


Therefore, required ratio = **5 : 3**

Alternative



So, apply to alligation

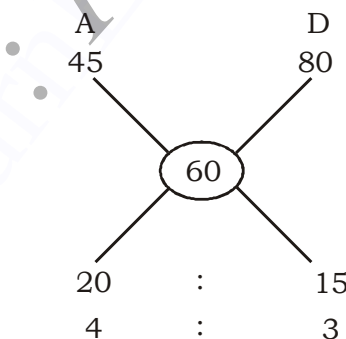


42. (b) **Note:** In such type of questions examiner wants to check your intelligency.

Since the average marks of sections B and C together are equal the average marks of all the four sections (i.e. A, B, C and D).

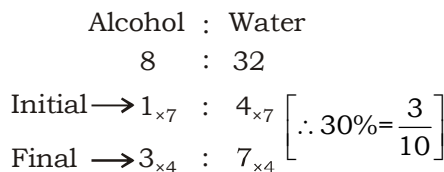
Therefore we can say the average marks of the remaining two sections A and D together will also be equal i.e. 60%.

Now by Alligation method,



∴ Required ratio of A and D section students = **4 : 3**

43. (b)



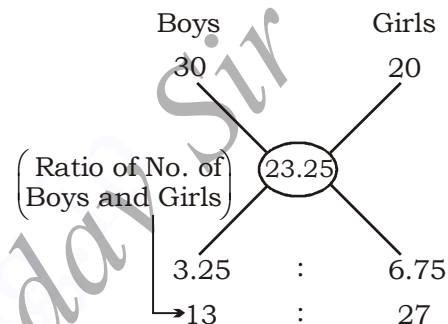
Note → Now we replaced the quantity of alcohol. So the quantity of water would be same.

After that new Ratio,

Alcohol	:	Water
7	:	28
+5		
12	:	28

Required quantity = 5 litres

44. (b) Now by alligation Method,



The possible number of boys and girls will be the multiple of 13 and 27 respectively.

So option (b) is correct.

Milk	:	Water
74	:	26
76	:	24

After Simplify

Milk	:	Water
37x6	:	13x6
19x13	:	6x13

We are replacing milk so quantity of water would be same.

Milk	:	Water
222	:	78
+25		
247	:	78

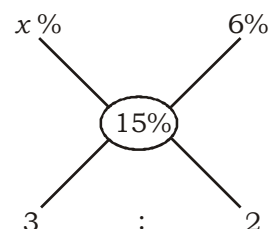
25 units = 7 litre

$$1 \text{ unit} = \frac{7}{25}$$

$$(247 + 78) \text{ units} = \frac{7}{25} \times 325$$

= **91 litres**

46. (b) By alligation method, Expenditure : Savings



$$\Rightarrow \frac{3x+12}{3+2} = 15$$

$$\Rightarrow 3x + 12 = 75$$

$$\Rightarrow 3x = 63$$

$$\Rightarrow x = 21\%$$

Percentage increase in expenditure = **21%**

Alternate:-

Let expenditure = 300,

Savings = 200

$\therefore$ Total income = Expenditure + income = 300 + 200 = 500

Increment in income

$$= \frac{500 \times 15}{100} = 75$$

Increment in savings

$$= \frac{200 \times 6}{100} = 12$$

Note:- Remaining increment (75 - 12 = 63) due to increment in expenditure.

$\therefore$ percentage increment in expenditure = $\frac{63}{300} \times 100 = 21\%$

47. (a) In First metal copper = $\frac{4}{5}$ kg

In First metal iron = $\frac{16}{5}$ kg

In second metal copper = $\frac{5}{6}$ kg

In second metal Iron = $\frac{25}{6}$ kg

Therefore, copper in the mixture = $\frac{4}{5} + \frac{5}{6} = \frac{49}{30}$ kg

Iron in the mixture = $\frac{16}{5} + \frac{25}{6}$

$$= \frac{221}{30} \text{ kg}$$

Required ratio = $\frac{49}{30} : \frac{221}{30}$

$$\Rightarrow 49 : 221$$

48 (b) Milk : Water
9 : 1

$3_{\times 3} : 1_{\times 3}$

Note: We are adding water in the mixture so quantity of milk would be constant.

After that new ratio,

Milk : Water
9 : 1 $\xrightarrow{+2}$ 10
 $\xrightarrow{+2}$ 3

10 units = 450 litres

1 unit = $\frac{450}{10} = 45$ litres

2 units = $45 \times 2 = 90$ litres

$\therefore$ Required amount of water = 90 litres

49. (b) Oil : Kerosene
 $3_{\times 2} : 2_{\times 2}$
 $2_{\times 3} : 3_{\times 3}$

Note:-

(i) Mixture is taken out from the container so ratio of oil and kerosene would not be change.

(ii) We are adding kerosene so quantity of oil would be constant.

After that new ratio,

Oil : Kerosene
6 : 4 $\xrightarrow{+5}$ 9
6 : 9

5 units = 10 litres

1 unit = 2 litres

10 units = 20 litres

Initial quantity of water = (20 + 10) = 30 litres

50. (a) By using formula,

$$\text{Final} = \text{initial} \left(1 - \frac{x}{m}\right)^n$$

Note: We have explained this formula earlier.

$$\Rightarrow 9 = (16 + 9) \left(1 - \frac{6}{m}\right)^2$$

$$\Rightarrow \frac{3}{5} = 1 - \frac{6}{m}$$

$$\Rightarrow \frac{6}{m} = 1 - \frac{3}{5}$$

$$\frac{6}{m} = \frac{2}{5} \Rightarrow m = 15$$

$\therefore$ quantity of mixture = **15 litres**

Alternate:-

Note: Initially the container was totally filled by milk.

$\therefore$ Total quantity of milk = (16 + 9) = 25 litres

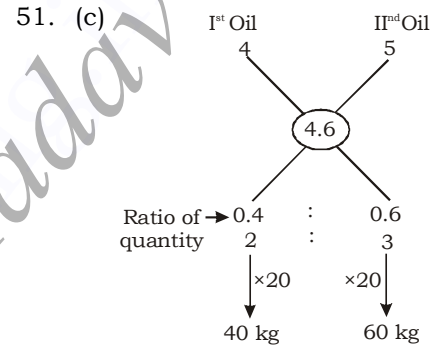
Number of operation = 2

Initial : Final
 $\sqrt{25} : \sqrt{9}$
5 : 3
 $\xrightarrow{-2 \text{ units}}$

2 units = 6 litres

1 unit = 3 litres

5 units = $3 \times 5 = 15$ litres



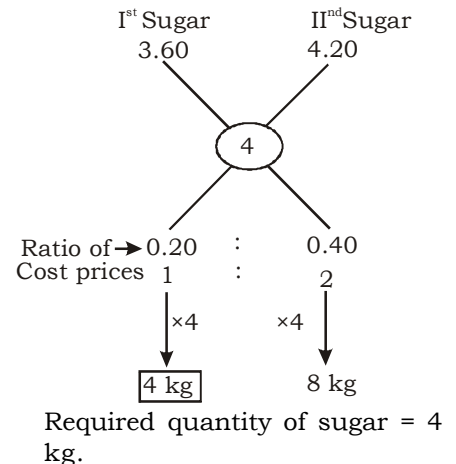
IInd type oil = 60 kg

52. (d) Selling price = Rs. 4.40

Profit = 10%

Cost price (CP)

$$= \frac{4.40}{(100 + 10)} \times 100 = \text{Rs. } 4$$



53. (d) $20\% = \frac{1 \rightarrow \text{wine}}{5 \rightarrow \text{total}}$

$\therefore$ Quantity of water = (5 - 1) = 4 units

Wine : Water
Initially $\rightarrow 1_{\times 3} : 4_{\times 3}$
Finally $\rightarrow 1_{\times 4} : 3_{\times 3}$

Note : To increase the quantity of wine in the mixture we have to add the quantity of wine. So we can say quantity of water will be same.

After equating the quantity
new ratio of wine and water.

Wine : Water

Initially $\rightarrow 3 : 12 \xrightarrow{+1} 15$ units

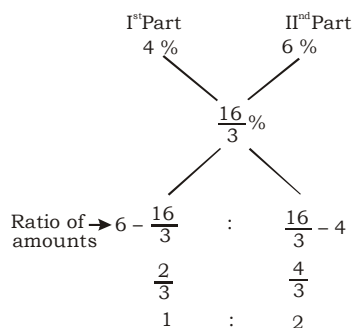
Finally $\rightarrow 4 : 12$

According to the question,
15 units = 125 gallons

$$1 \text{ unit} = \frac{125}{15} = 8.33 \text{ gallons}$$

54. (d) Average rate of interest

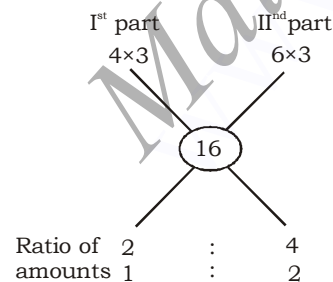
$$= \frac{960}{3600 \times 5} \times 100 = \frac{80}{3 \times 5} = \frac{16}{3} \%$$



$$\text{Amount lend on 4\%} = \frac{3600}{(2+1)} \times 1 = \text{Rs. 1200}$$

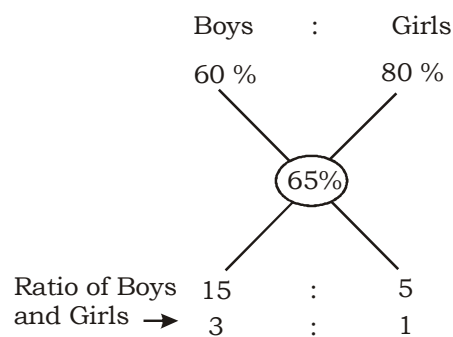
Alternatively:-

Note:- If you want to make your calculation earlier. Please try to avoid fraction part by multiplying 3.



$$\begin{aligned} \text{Amounts lend on } 4\% &= \frac{3600}{(1+2)} \\ &= \text{Rs. } 1200 \end{aligned}$$

55. (a) Total students = 400



Number of girls appeared in the

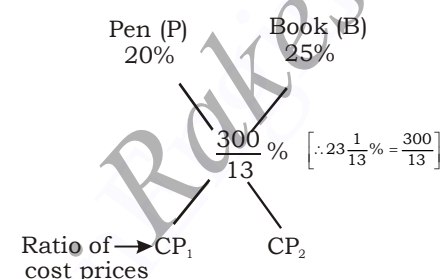
$$\text{examination} = \frac{400}{(3+1)} \times 1 = 100$$

56. (d) Let the cost of book and pen is B and P respectively.

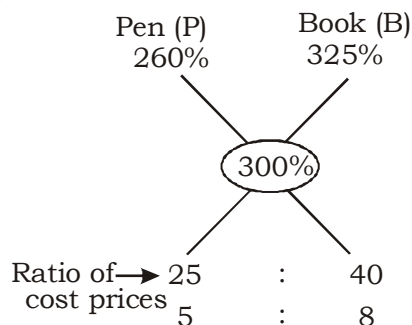
According to the question,

$$B + P = 1300 \quad \dots (i)$$

By alligation Method,



Note:- To make your calculation easier multiply all the parts by 13.

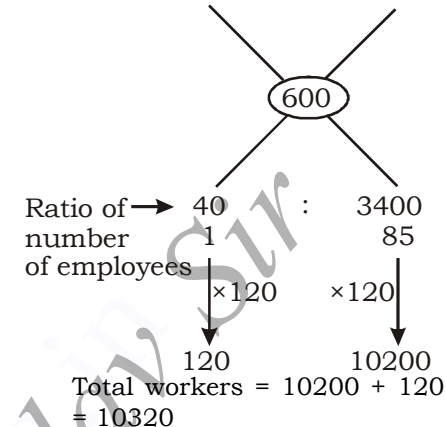


From equation (i)

Cost price of the book

$$= \frac{1300}{(8+5)} \times 8 = \text{Rs. } 800$$

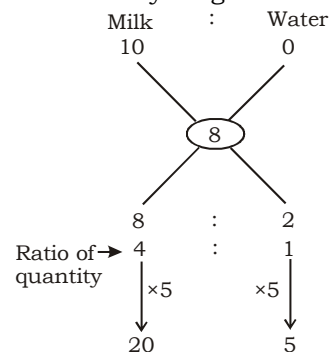
- | | |
|-------------------------------|----------------|
| 57. (b) By Alligation Method, | |
| Officers | Rest employees |
| 4000 | 560 |



58. (c) Selling price of the mixture
= Rs. 10/litre
Profit = 25%

$$\begin{aligned}\text{cost price} &= \frac{10}{(100+25)} \times 100 \\ &= \text{Cost price} \\ &= \frac{10}{(100+25)} \times 100 = \text{Rs. 8/litre}\end{aligned}$$

Note : Always remember if you are adding water, the cost price of water would always be zero. Now by alligation Method,



Total quantity of mixture
= (20 + 5) = 25 litres

Alternate:-

In these question,
since milkman is selling milk at
the rate of cost price (i.e., the rate
at which he purchased)

∴ The profit is entirely due to addition of water

Profit $\Rightarrow$ 25%

$$= \frac{1}{4} \rightarrow \text{milk} \rightarrow 20 \text{ L}$$

Total mixture
 $\Rightarrow 5 \text{ L} + 20 \text{ L} = 25 \text{ litres.}$

- 59. (c) Note:** In such type of ques-

tion always rememehr the below given formula.

$$\text{Final quantity} = \text{Initial quantity} \left(1 - \frac{x}{m}\right)^n$$

Where x

$\Rightarrow$ Quantity taken at a time

m $\Rightarrow$ Capacity of vessel

n $\Rightarrow$ Number of times process occurred

$$\text{Final quantity} = 50 \left(1 - \frac{5}{50}\right)^2$$

$$= 50 \times \left(\frac{9}{10}\right)^2 = 50 \times \frac{81}{100} = 40.5 \text{ litre}$$

tre

wine in the mixture = (50 - 40.5)

= 9.5 litre

Ratio of wine and water

= 9.5 : 40.5

= 19 : 81

Alternate

Part which is taken out = $\frac{5}{50}$

$$= \frac{1}{10}$$

Initial	:	Final water
10	:	9
10	:	9
100	:	81
- (19)		

Ratio of wine and water = 19 : 81

60. (b)

$$\text{Final} = \text{initial} \left[1 - \frac{x}{m}\right]^n$$

By above formula,

Final quantity of spirit

$$= 20 \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5}$$

$$= \frac{4096}{625} = 6 \frac{346}{625} \text{ litres}$$

Alternate

$$\frac{4}{20} = \frac{1}{5}$$

Quantity of spirit (initially)	:	Quantity of spirit (finally)
5	:	4
5	:	4
5	:	4
5	:	4
5	:	4

$$3125 : 1024$$

$$3125 \text{ units} = 20 \text{ litres}$$

$$1 \text{ unit} = \frac{20}{3125} = 1024 \text{ units}$$

$$= \frac{20}{3125} \times 1024 = 6 \frac{346}{625} \text{ litres}$$

$$\text{Finally left spirit} = 6 \frac{346}{625} \text{ litres}$$

61. (c) Using formula

$$\text{Final} = \text{initial} \left(1 - \frac{x}{m}\right)^n$$

Let initial quantity = Q litres

$$10 = Q \left(1 - \frac{1}{4}\right)^4$$

$$10 = Q \left(\frac{3}{4}\right)^4$$

$$10 \times 4 \times 4 \times 4 \times 4 = 81 \times Q$$

$$Q = \frac{2560}{81} \text{ litres}$$

$$\therefore \text{Initial quantity} = \frac{2560}{81} \text{ litres}$$

Alternate

Initial	Final
4	3
4	3
4	3
4	3
256	81

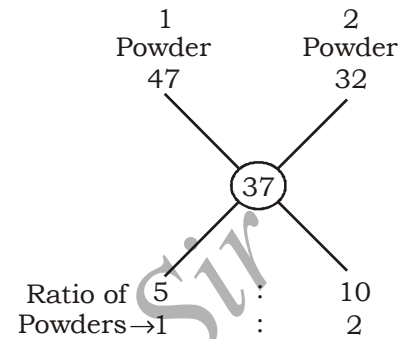
According to the question,
81 units = 10 litres

$$1 \text{ unit} = \frac{10}{81}$$

$$256 \text{ units} = \frac{10}{81} \times 256$$

$$= \frac{2560}{81} \text{ litres}$$

62. (a)



63. (d) After two operations of stealing, ratio of liquid soap and water.

Liquid Soap	:	Water
36	:	13

Note: We know in starting the container was filled with liquid soap.

Initially liquid Soap	:	Finally liquid Soap
(36 + 13)	:	36
$\sqrt{49}$	:	$\sqrt{36}$
7	:	6
-1		

1 unit = 4 pound

7 units = $4 \times 7 = 28$ pounds

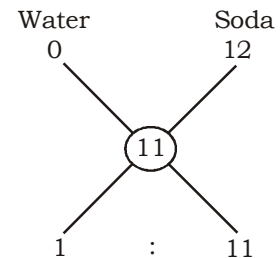
64. (c) Selling price = Rs. 13.75

$$25\% = \frac{1}{4}$$

$$\text{CP} : \text{SP} = 4 : 5$$

$$\text{CP} = \frac{13.75}{5} \times 4 = \text{Rs. } 11$$

Now By alligation Method,



Required ratio = 1 : 11

65. (c) Sum = Rs. 36.90 = 3690 paise

Now By alligation Method,

20 paise 50 paise

Ist IInd
1800 4500

(3690)

Ratio of
Number 810 : 1890
of Coins → 3 : 7
Number of 20 paise coins

$$= \frac{90}{(3+7)} \times 3 = 27$$

Alternate

20 paise 50 paise
18 45

(36.90)

8.10 : 18.90
3 : 7

Number of 20 paise coins

$$= \frac{90}{(3+7)} \times 3 = 27$$

66. (a) Let the initial cost price of milk = 5x

Note: He sells pure milk at Cost price. But he gains 25% because he mixes with it adulterate fat.

$$\therefore \text{Actual Cost price} = \frac{5x}{125} \times 100 = 4x$$

Adulterate fat Milk
0 3x

(4x)

x : 4x
Ratio of → 1 : 4
Quantities

Required percentage of

$$\text{adulterate fat} = \frac{1}{(1+4)} \times 100 = 20\%$$

Alternate

$$25\% = \frac{1 \rightarrow \text{Adulterate fat}}{4 \rightarrow \text{Pure milk}}$$

Note: Always remember Numerator represents the value which is freely available, and denominator represents the value which is available on Cost.

Total mixture = (1 + 4) = 5

$$\text{Required percentage of adulterate fat} = \frac{1}{5} \times 100 = 20\%$$

67. (c)

Alcohol : Water

$$\text{Initial} \rightarrow 9_{x7} : 1_{x7} \left[\therefore 10\% = \frac{1}{10} \right]$$

$$\text{Final} \rightarrow 7_{x9} : 1_{x9} \left[\therefore 12\frac{1}{2}\% = \frac{1}{8} \right]$$

Note:- Water is added to the above mixture so the quantity of alcohol should be same.

$$\begin{array}{rcl} \text{Alcohol} & : & \text{Water} \\ 70 \leftarrow \oplus 63 & : & 7 \\ & & 9 \end{array} \quad +2$$

70 units = 70 litres

1 unit = 1 litres

2 units = 1 × 2 = 2 litres

Required water = 2 litres

68. (d)

Milk : Water

$$\text{Initial} \rightarrow 9 : 1 \left[\therefore 10\% = \frac{1}{10} \right]$$

$$\text{Final} \rightarrow 3_{x3} : 1_{x3} \left[\therefore 25\% = \frac{1}{4} \right]$$

Note:- Water is added to the above mixture so the quantity of milk should be same.

New ratio, of milk and water.

$$\begin{array}{rcl} \text{Milk} & : & \text{Water} \\ 10 \leftarrow \oplus 9 & : & 1 \\ & & 3 \end{array} \quad +2$$

10 units = 20 litres

1 unit = 2 litres

2 units = 4 litres

Quantity of water to be added = 4 litres.

69. (c) Selling price = Rs. 300 per quintal

$$\text{Profit} = 25\% = \frac{1}{4}$$

$$\text{Cost Price} = \frac{300}{5} \times 4$$

$$= \text{Rs. } 240/\text{quintal}$$

Q₁ Q₂
200 260

(240)

Ratio of → 20 : 40
quantity 1 : 2

2 units = 52 quintals

$$1 \text{ unit} = \frac{52}{2} = 26 \text{ quintals}$$

$$70. (a) 11.11\% = \frac{1}{9}$$

$$\text{Cost price} = \frac{8.5}{10} \times 9 = \text{Rs. } 7.65/\text{litre}$$

Now by Alligation Method,

Milk Water
8.5 0

(7.65)

Ratio of
Quantities
of milk and 7.65 : 0.85
water → 9 : 1

$$\text{Required quantity of water} = \frac{1}{9} = .111 \text{ litres}$$

71. (b)

Milk : Water

$$\text{I}^{\text{st}} \rightarrow 1_{x2} : 3_{x2}$$

$$\text{II}^{\text{nd}} \rightarrow 3_{x3} : 1_{x3}$$

According to the question,

2 gallons of the first are mixed with 3 gallons of the second.

∴ multiply first part by 2 and 2nd part by 3.

New ratio of milk and water.

Milk : Water

$$\begin{array}{rcl} 2 & : & 6 \\ 9 & : & 3 \end{array} \quad +2$$

$$11 : 9$$

Ratio of milk to water = 11 : 9

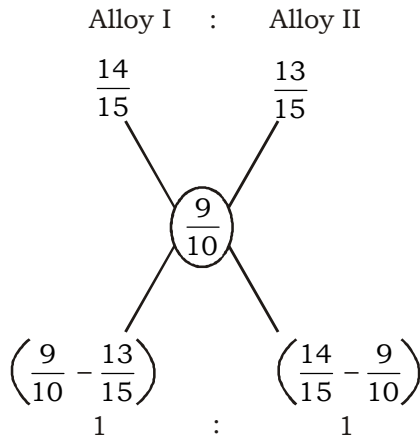
72. (d) 93.33%

$$= \left(93 + \frac{1}{3}\right)\% = \frac{280}{3 \times 100} = \frac{14}{15}$$

$$86.66\% = \left(86 + \frac{2}{3}\right)\%$$

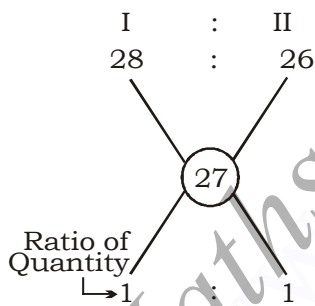
$$= \frac{260}{3 \times 100} = \frac{13}{15}$$

$$90\% = \frac{9}{10}$$



Note: To make your calculation easier multiply by 30 (LCM of 15, 15, 10) in all parts.

New ratio,



$$\text{Required weight} = \frac{50}{(1+1)} \times 1$$

$$= 25 \text{ kg}$$

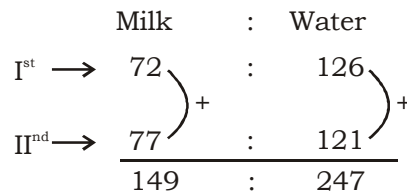
73. (a) Milk: Water

$$\text{I}^{\text{st}} \rightarrow 4_{\times 18} : 7_{\times 18} \rightarrow 11_{\times 18}$$

$$\text{II}^{\text{nd}} \rightarrow 7_{\times 11} : 11_{\times 11} : 18_{\times 11}$$

Note: Capacity of containers are equal.

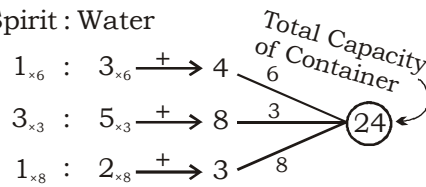
$\therefore$ New ratio of milk and water.



Ratio of milk : water = 149 : 247

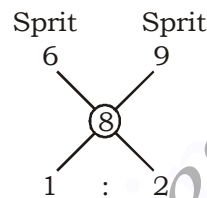
74. (c)

Spirit : Water

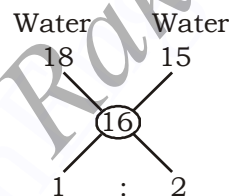


Note: In such type of questions try to equal the capacity of containers.

Now By Alligation Rule,



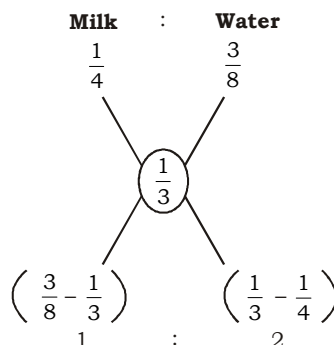
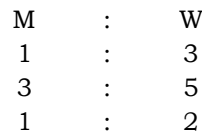
$\therefore$ Required ratio = 1 : 2



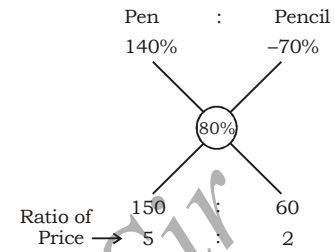
$\therefore$ Required ratio = 1 : 2

Note: We can take any part of mixture and then it can be solved by alligation.

Alternate:

**75. (b)** Total gain = Rs. 4

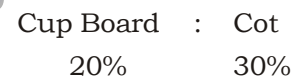
$$\% \text{ gain} = \frac{4}{35} \times 100 = \frac{80}{7}\%$$



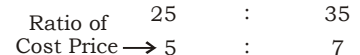
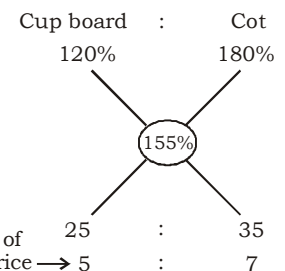
$$\text{Cost price of pen} = \frac{35}{(5+2)} \times 5 = \text{Rs. 25}$$

76. (c) Total profit = 25.833%

$$= 25 \frac{5}{6}\% = \frac{155}{6}\%$$



Multiply by 6 in all parts, Then,

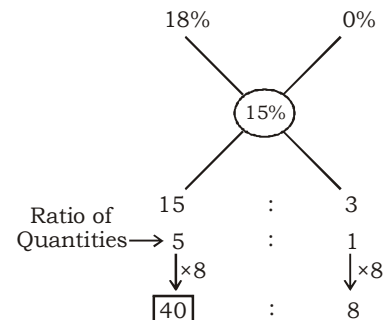


Cost price of Cupboard

$$= \frac{18000}{(5+7)} \times 5 = 1500 \times 5 = \text{Rs. 7500}$$

77. (d) By alligation Method,

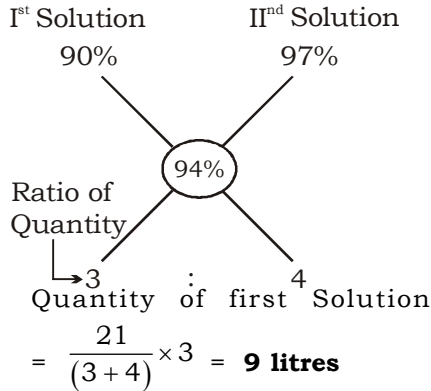
Kerosen : Kerosen in replaced amount of petrol



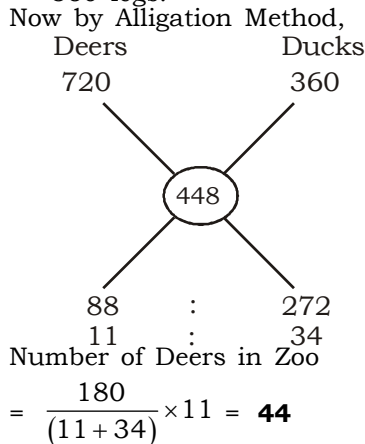
Note: In petrol kerosene would be 0%.

Total mixture hold in vessel

$$= (40 + 8) = 48 \text{ litres}$$

78. (c) By Alligation Rule,**79. (c) Note:** In such type of question follow the below given procedure.

- (i) If all the animals were deers then we would have 720 legs.
- (ii) If all the animals were ducks then we would have 360 legs.

**Alternate:-**

Let number of Deers = x

$\therefore$ Number of ducks = $(180 - x)$

According to the question,

$\Rightarrow 4x + (180 - x)2 = 448$

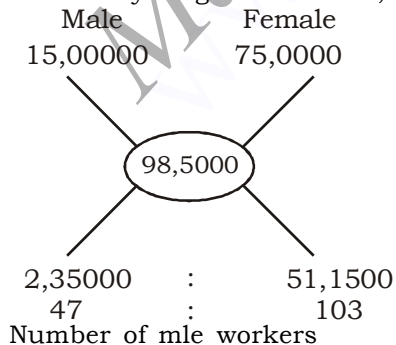
$\Rightarrow 4x + 360 - 2x = 448$

$\Rightarrow 2x = 88 \Rightarrow x = 44$

80. (c) Note $\rightarrow$ In this question try to think like previous question,

- (i) If all the workers were Male workers.
- (ii) If all the workers were female workers.

Now by alligation Method,



$$= \frac{300}{(47+103)} \times 47 = 94$$

Alternate $\rightarrow$ Let the number of male workers = x

$\therefore$ The number of female workers = $(300 - x)$

$$5000x + (300 - x)2500 = 9,85,000$$

$$2500x + 750000 = 9,85,000$$

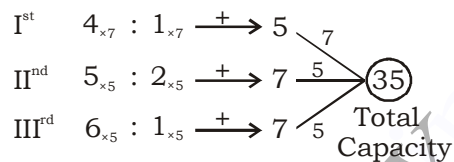
$$2500x = 985000 - 750000$$

$$2500x = 235000 \Rightarrow x = 94$$

$\therefore$ Number of male workers = **94**

81. (b)

Milk : Water

**Note:** It is given that capacity of all the vessels are equal.

$\therefore$ New ratio of milk and water,

Milk : Water

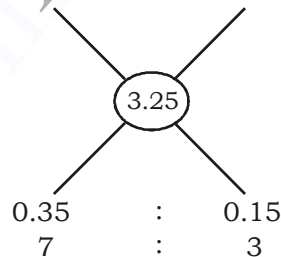
$$\text{I}^{\text{st}} \rightarrow 28 : 7$$

$$\text{II}^{\text{nd}} \rightarrow 25 : 10$$

$$\text{III}^{\text{rd}} \rightarrow 30 : 5$$

$$\hline 83 : 22$$

$\therefore$ Required ratio of milk and water = **83 : 22**

82. (d) 3.10 3.60

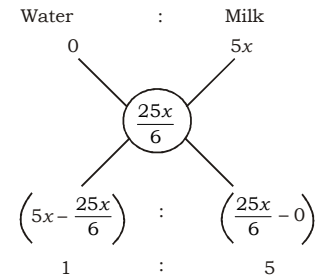
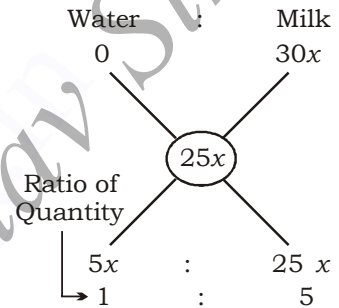
Required Ratio of proportion = **7 : 3**

83. (d) We can not determine the answer of this question as we don't know the price per kg of the other type of ghee. Hence, Option (d) is Correct.**84. (b)** $20\% = \frac{1}{5}$ Let CP = $5x$

$$\text{But actual CP} = \frac{5x}{120} \times 100$$

$$= \frac{25x}{6}$$

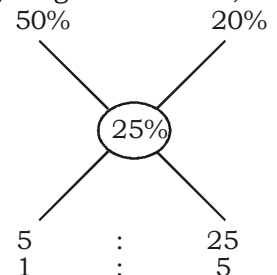
Now by alligation method,

**Note:-** To make your calculation easier multiply all part by 6.**Alternate:-**

$$20\% = \frac{1 \rightarrow \text{Water}}{5 \rightarrow \text{Milk}}$$

Note: Since the mixture is sold at Cost price hence the profit earned is equal to the quantity of water added in the mixture.

$\therefore$ Required ratio of water to milk = **1 : 5**

85. (b) By alligation method,**Note:** 20% spirit is mixed with 50% spirit to get 25% spirit. The ratio of mixing would be 5 : 1.

Required percentage of stole part

$$= \frac{5}{(5+1)} \times 100 = \frac{500}{6} =$$

83.33%**86. (c)** $133.33\% = \frac{4}{3}$

Denomi- $\rightarrow$ 1 Rs. 50 paise 25 paise

nation

Number $\rightarrow 3x : (105 - 10x) : (3x + 4x)$

of Coins

$$3x : (105 - 10x) : 7x$$

$$\text{Amount} \rightarrow 3x : \frac{1}{2}(105 - 10x) : \frac{7x}{4}$$

According to the question,

$$3x + \frac{1}{2}(105 - 10x) + \frac{7x}{4} = 50.5$$

$$3x + 52.5 - 5x + 1.75x = 50.5$$

$$-0.25x = -2$$

$$x = 8$$

Number of Rs. 1 coins = $3x$
 $= 3 \times 8 = 24$

Alternate:-

Note: To save your valuable time you can take help from options and then satisfy the question condition.

Option (c)

1 Rs. Coins = 24 $\Rightarrow$ 24 Rs.

According to the question,

$$25 \text{ paise coins} = 24 \times \left(1 + \frac{4}{3}\right)$$

$= 56 \text{ coins} \Rightarrow 14 \text{ Rs.}$

Remaining Coins = $105 - (24 + 56)$

$= 25 \text{ coins [50 paise coins]}$

$\Rightarrow 12.5 \text{ Rs.}$

Adding of values of coins we get

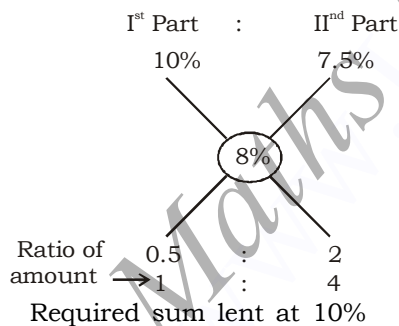
$\Rightarrow 24 + 14 + 12.5 = 50.5 \text{ Rs.}$

Total above value is same as mentioned in question, so option (c) is correct.

87. (c) Average rate of interest

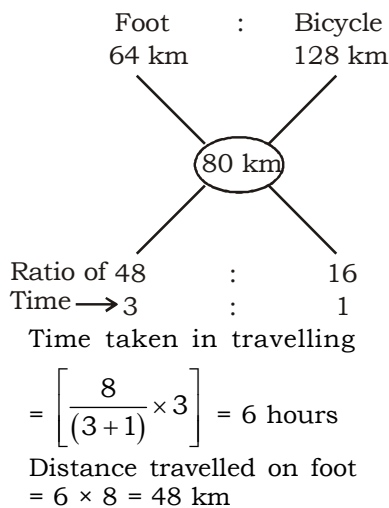
$$= \frac{1904}{6800} \times \frac{100}{7} \times 2 = 8\%$$

By alligation Method,



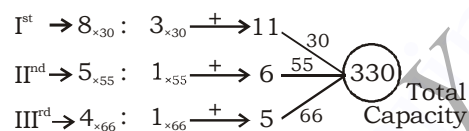
$$= \frac{6800}{(1 + 4)} \times 1 = \text{Rs. } 1360$$

88. (c) Note: In such type of question follow the below given method and for detailed solution check earlier questions of same type.

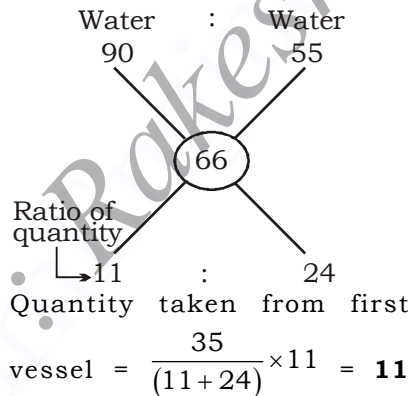


89. (a)

Milk : Water

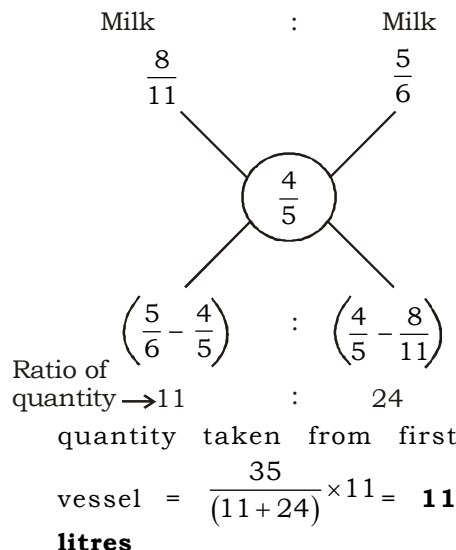


Note: Now take any part of the mixture and solve it by alligation method,



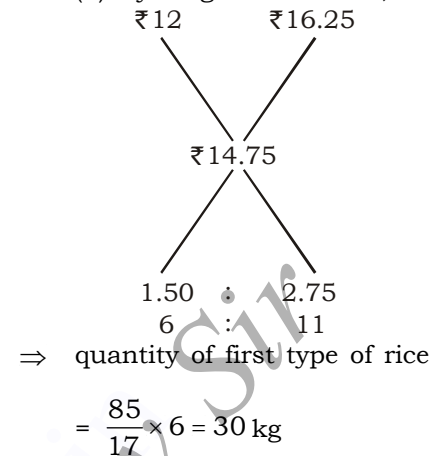
litres

Alternate:



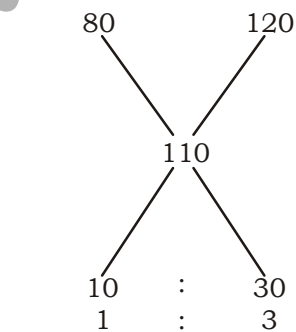
litres

90. (b) By alligation Method,



91. (d) C.P of final mixture

$$= \frac{121}{110} \times 100 = ₹110/\text{kg}$$



92. (c) Since after the mixture is taken out and water is added the quantity of milk will remain same so,

	M	W		M	W
old	3	: 2			
After mixture taking out	$3_{\times 4} = 12$	:	$2_{\times 4} = 8$		
Now	12	: 13	= 25		

We also know that quantity of mixture taken

out = quantity of water added

so, we can say

Total quantity of mixture initially = Total quantity of mixture finally.

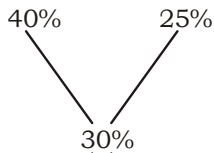
Hence,

25 units $\rightarrow$ 50 litres

5 units $\rightarrow$ 10 litres

Hence quantity of mixture taken out = 10 litres

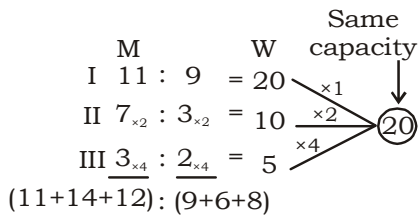
93. (c) By Alligation Method,



Hence the part of wine taken

$$\text{out} = \frac{2}{2+1} = \frac{2}{3}$$

94. (a)



Hence the required percentage

$$= \frac{37}{23} \times 100 = 160.86\% \approx 160\%$$

95. (c) $\frac{20}{200} = 10\%$

⇒ 10% of mixture is taken out each time

⇒ mixture milk

$$10 \rightarrow 9$$

$$10 \rightarrow 9$$

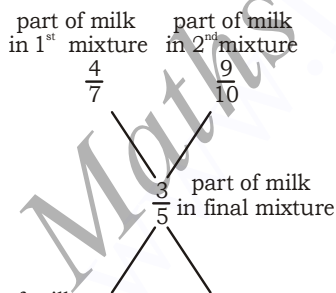
$$10 \rightarrow 9$$

$$1000 \rightarrow 729$$

⇒ water = $1000 - 729 = 271$

⇒ required ratio = $729 : 271$

96. (c) By alligation Method



Ratio of milk to water in final mixture $\frac{3}{10} : \frac{1}{35}$

⇒ Required ratio = 21 : 2

97. (c) $64 + 17 = 81$

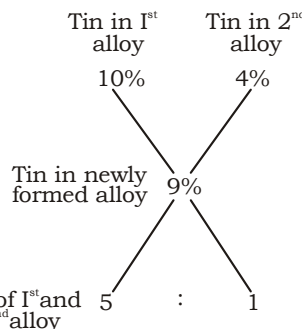
let initial quantity was 81 units

final quantity of milk = 64 units

$$\Rightarrow \sqrt{81} \rightarrow \sqrt{64} \Rightarrow \frac{9 \rightarrow 8}{1 \rightarrow 5} \text{ litre}$$

$$\Rightarrow 9 \rightarrow 45 \text{ litre}$$

98. (b) By alligation Method,



Ratio of 1st and 2nd alloy 5 : 1

Hence required ratio = 5 : 1

99. (a) Since $16\frac{2}{3}\% = \frac{1}{6}$

$$\text{Initial ratio} \rightarrow \frac{W}{S} = \frac{5}{1} = 5$$

$$\text{final ratio} \rightarrow \frac{W}{S} = \frac{9}{1} = 9$$

$$\Rightarrow 6 \text{ units} \rightarrow 36 \text{ litre}$$

$$\Rightarrow 1 \rightarrow 6 \text{ litre}$$

$$\Rightarrow 4 \rightarrow 24 \text{ litre}$$

Alternatively:-

Since the quantity of spirit in the mixture is constant so,



But now, in new mixture,

Spirit = 10% of mixture and i.e. = 6 litre

Total mixture = 60 litre

So, water in the new mixture $(60 - 6) = 54 \text{ litre}$

then the quantity of water added

$$1 = 54 - 30 = 24 \text{ litre}$$

$$\text{Water} = 90\% = 9 \times 6 = 54 \text{ litre}$$

The quantity of water to be added = $54 - 30 = 24 \text{ litre}$

100. (a) Total quantity of the final mixture = $6 + 4 + 1.5 + .5 = 12 \text{ litre}$

Total quantity of the water in the final mixture

$$= 6 \times \frac{15}{100} + 4 \times \frac{10}{100} + .5$$

$$= .9 + .4 + .5 = 1.8 \text{ litre}$$

Hence the required percentage

$$= \frac{1.8}{12} \times 100 = 15\%$$

101. (a) As we know mixtures from both the vessels are mixed in 4 : 5, so we need to make then in 4 : 5

	M	W	A
I st vessel	4	5	3 = 12 _{x5}
II nd vessel	7	3	10 _{x6}

$$\begin{array}{r} \text{M} \quad \text{W} \quad \text{A} \\ \downarrow 20_{x4} \quad 25_{x4} \quad 15_{x4} = 60_{x4} \\ \downarrow 42_{x5} \quad 18_{x5} = 60_{x5} \\ \hline 80 : 310 : 150 = 540 \end{array}$$

Hence part of alcohol in the

$$\text{new mixture} = \frac{150}{540} = \frac{5}{18}$$

102. (b) Let there be any ratio of Gold and silver in the article for example the ratio is 10 : 18 and let the respective rate per gram of gold and silver is x and y

Case I :

$$10x + 18y = 8760 \quad \dots(i)$$

case II:

when the weight of both metals are interchanged in jewellery

$$18x + 10y = (8760 - 1560) \dots(ii)$$

adding equation (i) and (ii)

$$28x + 28y = 15960$$

$$\text{or } x + y = 570$$

and $y = 90 \Rightarrow x = 480$ (Rate of silver is Rs. 90/gm.)

⇒ rate of gold = 480/gm.

Now by method of alligation (let all the article is

made of gold or silver)

Gold 2520 Silver 13440

$$2520 \quad 13440$$

$$8760$$

$$4680 : 6240$$

Quantity of gold

$$= \frac{28}{7} \times 3 = 12 \text{ gram}$$

and quantity of silver

$$= \frac{28}{7} \times 4 = 16 \text{ gram}$$

- 103.(d) Since the mixture is sold at the cost price of the milk hence the profit made on selling it will be equal to water added to it

$$\text{Profit } 25\% = \frac{1}{4} \leftarrow \begin{matrix} \text{profit (water)} \\ \text{c.p (Milk)} \end{matrix}$$

Hence the ratio of milk to water = 4 : 1

$$\begin{array}{ccc} \text{M} & : & \text{W} \\ 4 & : & 1 = 5 \\ \downarrow \times 200 & & \downarrow \times 200 \quad \downarrow \times 200 \\ 800\text{ml} & : & 200\text{ml} = 1000\text{ml} \end{array}$$

So, he mixes 200 ml water in a litre of milk

- 104.(c) Since after the mixture is taken out and it is replaced with liquid B, the quantity of liquid A in the mixture will be same

$$\begin{array}{l} \text{Initially } A : B = 5 : 3 \\ \text{After taking out } 5_{\times 3} : 3_{\times 3} = 8_{\times 3} \Rightarrow 15 : 9 \\ \text{Final } 3_{\times 5} : 5_{\times 5} = 8_{\times 5} \Rightarrow 15 : 25 \end{array} \quad \begin{array}{l} A : B \\ 15 : 9 \\ +16 \\ 15 : 25 \end{array} = 24$$

We know that initial total quantity of mixture = final total quantity of mixture

But

16 units $\rightarrow$ 16 litres

40 units $\rightarrow$ 40 litres

So,

Hence initial quantity of mixture = 40 litre

- 105.(d) Quantity of milk in initial

$$\text{mixture} = \frac{90}{100} \times 70 = 63 \text{ litres}$$

- $\Rightarrow$ Quantity of water in the

$$\text{final mixture} = \frac{63}{75} \times 25 = 21 \text{ litres}$$

- $\Rightarrow$ Quantity of water to be added = 21 - 7 = 14 litres.

- 106.(a)

$$\begin{array}{ccc} A & B & C \\ \text{Initially } x & y & z \\ \text{Final } \frac{2x}{3} + 1 & \frac{3}{4}(y + \frac{1}{3}x) & 9 = \frac{9}{10}[z + \frac{1}{4}y + \frac{3}{4}x] \end{array}$$

[Note: In the last C would have left with 10 litre water of which

$$\frac{1}{10} = 1 \text{ litre is poured into A,}$$

making 9 litre water in each glass.]

$$\text{So, } \frac{2x}{3} + 1 = 9$$

$$x = 12 \text{ litre}$$

$$\frac{3}{4}\left(y + \frac{1}{3} \times 12\right) = 9$$

$$y + 4 = 12$$

And in the last

$$\frac{9}{10}\left[\frac{1}{4}\left(y + \frac{1}{3}x\right) + z\right] = 9$$

$$z = 7 \text{ litre}$$

Alternatively:-

We can easily go through options also.

- 107.(c) By alligation Method,

$$\begin{array}{ccc} A & & B \\ 5\% & & 40\% \\ & \searrow & \swarrow \\ & 30\% & \\ & \swarrow & \searrow \\ 10 & & 25 \\ 2 & : & 5 = 7 \\ \downarrow \times 20 & & \downarrow \times 20 \quad \downarrow \times 20 \\ 40 & & 100 \quad 140 \end{array}$$

Hence quantity of A = 40 tonnes

and quantity of B = 100 tonnes

- 108.(d) C.P of final tea

$$= \frac{100}{125} \times 100 = ₹ 80$$

Now by rule of alligation

$$\begin{array}{ccc} 75 & & 90 \\ & \searrow & \swarrow \\ & 80 & \\ & \swarrow & \searrow \\ 10 & : & 5 \\ 2 & : & 1 \end{array}$$

Required ratio = 2 : 1

- 109.(a) Let the initial quantity of milk and water in the mixture is 4x and x respectively then,

$$\frac{4x + 10}{x + 20} = \frac{5}{3}$$

$$12x + 30 = 5x + 100$$

$$x = 10$$

Hence the initial quantity of milk = 4x = 40 litre

and the initial quantity of water = x = 10 litre

Alternatively:-

Ratio of milk and water added in the original mixture = 1 : 2

Initially $\rightarrow$ 4 : 1.....(I)

Added $\rightarrow$ 1 : 2.....(ii)

Final $\rightarrow$ 5 : 3.....(iii)

Now rule of alligation

$$\begin{array}{ccc} \text{Initial} & & \text{Added} \\ \frac{4}{5} & & \frac{1}{3} \\ & \searrow & \swarrow \\ & \frac{5}{8} & \\ & \swarrow & \searrow \\ \frac{7}{24} & : & \frac{7}{40} \\ \updownarrow & & \updownarrow \\ 5 & : & 3 \\ \downarrow \times 10 & & \downarrow \times 10 \\ 50 & : & 30 \end{array}$$

quantity of milk and water in the initial mixture = 40 litre, 10 litre respectively

Note: Save your time by Checking through options.

- 110.(c)

$$\begin{array}{ccc} \text{Milk} & \text{Water} & \text{M:W} \\ \text{Initially } 5 & : & 3 \\ \text{After taking } 5_{\times 7} : 3_{\times 7} = 8_{\times 7} \Rightarrow 35 : 21 & & \\ \text{out mixture} & & +24 \\ \text{Final } 7_{\times 9} : 9_{\times 5} = 16_{\times 9} \Rightarrow 35 : 45 & & = 80 \end{array}$$

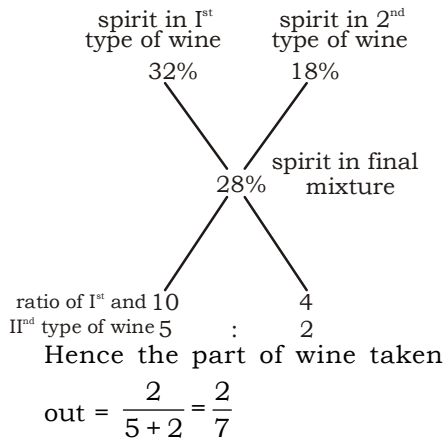
Total quantity of the mixture = 80 litres

80 units $\rightarrow$ 80 litres

24 units $\rightarrow$ 24 litres

Hence 24 litre mixture was taken out.

111. (c)



112. (b) **Note:** If no further information about the capacity of two vessels is given, consider them of same capacity.

Now we will explain the question taking simultaneous effect on two vessels.

Vessel A

	M	W
Initial	250	150
	-50	-30
(I) step	200	120
	+148	+44
(II) step	348	164

Vessel B

	M	W
Initial	320	80
	+50	+30
(I) step	370	110
	-148	-44
(II) step	222	66

Hence final ratio of milk to water in first vessel = 348 : 164 = 87 : 41

Final ratio of milk to water in second vessel = 222 : 66 = 37 : 11

113. (b)

	Water	Alcohol
I	4	3
II	5	2
III	7	4
Final	65	35

Hence the part of alcohol in the final mixture = $\frac{35}{100} = \frac{7}{20}$

114. (c) Required purity of Gold

$$= \frac{22+18+12}{3} = \frac{52}{3} = 17.33$$

carat

115. (c) According to question the quantity of mixture taken out at

$$a \text{ time} = \frac{10}{120} = \frac{1}{12}$$

Total Mixture	Left water after removing
12	11
12	11
12	11
1728	1331

Required quantities are, water

$$= \frac{120}{1728} \times 1331 = 92.43 \text{ litre}$$

and spirit

$$= 120 - 92.43 = 27.57 \text{ litre.}$$

$$116. (a) \frac{40}{500} = \frac{2}{25}, \frac{20}{500}, \frac{1}{25}, \frac{10}{500} = \frac{1}{50}$$

Now by question,

Mixture	Milk
25	23
25	24
50	49
31250	27048

quantity of milk now

$$= \frac{500}{31250} \times 27048 = 32.76 \text{ litres}$$

117. (b) Milk : Water

$$100 : 69$$

Total quantity = 169

Milk Initially	Milk later
$\sqrt{169}$	$\sqrt{100}$
13	10

-3 units

3 units → 6 litres

13 units → 26 litres

Hence the initial quantity of milk = 26 litres

118. (c) Let initial quantity of milk = 6 units and price of each litre = x

$$\Rightarrow \text{profit earned} = 6x \times \frac{1}{6} = x$$

$$\Rightarrow \text{quantity of water} = \frac{x}{x} \text{ units} = 1 \text{ unit}$$

$$\Rightarrow \text{required ratio} = 6 : 1$$

Alternatively:-

$$\therefore 16\frac{2}{3}\% = \frac{1}{6} \leftarrow \text{water}$$

$$\leftarrow \text{milk}$$

Hence the required ratio = 6 : 1

119. (a) Required purity of the gold in the new ring

$$= \frac{8 \times 22 + 10 \times 20 + 16 \times 16}{8 + 10 + 16}$$

$$= \frac{176 + 200 + 256}{34} = \frac{632}{34}$$

$$= 18.58 \text{ carat.}$$

120. (c) W : A

$$4 : 3 = 7 \quad \dots(i)$$

$$5 : 2 = 7 \quad \dots(ii)$$

$$7 : 3 = 10 \quad \dots(iii)$$

Multiply (i), (ii) and (iii) by 10, 10, 7 respectively

$$W : A$$

$$40 : 30 = 70$$

$$50 : 20 = 70$$

$$49 : 21 = 70$$

$$139 : 71 = 210$$

$$\Rightarrow \text{Required ratio} = 71 : 139$$

121. (b) S : W : A

$$I \quad 1.8 \quad 8.2 \quad = 10$$

$$II \quad 14 \quad 6 \quad = 20$$

$$III \quad 6 \quad 12 \quad = 18$$

$$7.8 : 22.2 : 18 = 48$$

$$\text{required part} = \frac{18}{48} = \frac{3}{8}$$

Note: Ratio remains same either it is a part of mixture or the whole mixture]

122. (a)

	H ₂ SO ₄	Water
A	5	2
B	3	5
Resulting mixture	1	1

⇒ By the rule of alligation

H ₂ SO ₄ in Bottel A	H ₂ SO ₄ in Bottel B
5	3
7	8
H ₂ SO ₄ in final mixture	1
1	2
1	3
8	14

$$\Rightarrow 7 : 12 = 19$$

$\Rightarrow$ Required quantites are
quantity of mixture from A

$$= \frac{190}{19} \times 7 = 70 \text{ litre}$$

quantity of mixture from B

$$= \frac{190}{19} \times 12 = 120 \text{ litre}$$

123.(d) New ratio in Ist mixture

$$= 6 \times \frac{4}{5} : 5 \times \frac{3}{4} : 3 \times \frac{3}{5}$$

$$= 32 : 25 : 12$$

New ratio in IInd mixture

$$= 3 \times \frac{4}{5} : 5 \times \frac{3}{4} : 6 \times \frac{3}{5}$$

$$= 16 : 25 : 24$$

Now ratio of combined
mixture = 48 : 50 : 36

required ratio = 24 : 25 : 18

124.(d) Per kg cost of the mixture

$$= \frac{7 \times 20 + 6 \times 30 + 5 \times 40 + 2 \times 80}{7 + 6 + 5 + 2}$$

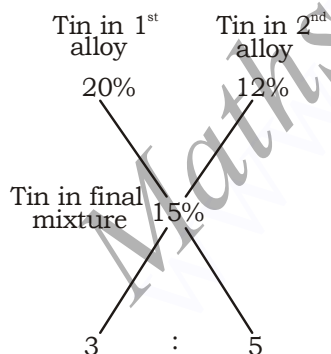
$$= \frac{140 + 180 + 200 + 160}{20}$$

$$= \frac{680}{20} = ₹ 34$$

Hence to earn 15% profit the
selling price of the mixture

$$= \frac{115}{100} \times 34 = ₹ 39.10 \text{ per kg}$$

125.(d) To find the ratio, using
alligation method, we have



Now,

Copper Tin Others

$$(I) \rightarrow 80_{\times 3} : 20_{\times 3} : \dots = 100_{\times 3}$$

$$(II) \rightarrow 85_{\times 5} : 12_{\times 5} : 3_{\times 5} = 100_{\times 5}$$

$$\text{New} \rightarrow (240 + 425) : (60 + 60) : 15 = 800 : 120 : 15 = 800$$

Hence the required percentage

of copper in

$$\text{new alloy} = \frac{665}{800} \times 100 = 83.12\%$$

126.(a) As discussed earlier in
question number 13

We can take any ratio of weights
of two metals to find the cost

Let quantity of gold and silver
be 28 gram and 7 gram
respectively and their respective
per gram costs be x and y

$$\text{case (I)} \quad 28x + 7y = 13440$$

$$\text{case (II)} \quad 7x + 28y = 9660$$

$$35x + 35y = 23100$$

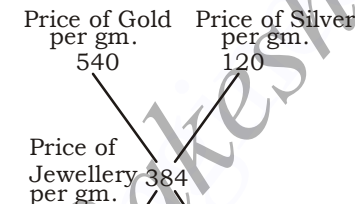
$$\Rightarrow x + y = \frac{23100}{35} = 660$$

$$\text{and } x = 540 \Rightarrow y = 120$$

per gram cost of jewellery

$$= \frac{13440}{35} = ₹ 384$$

Now by method of alligation



Ratio of weights
of Gold
and Silver 22 : 13 = 35

respective weights of gold and
silver are 22 gm and 13 gm.

127.(c) **Milk : Water**

$$3 : 1 = 4 \quad \dots (i)$$

$$4 : 3 = 7 \quad \dots (ii)$$

$$5 : 2 = 7 \quad \dots (iii)$$

By multiply (i) (ii) and (iii) by
42, 16, 12 we get

Milk : Water

$$126 : 42$$

$$64 : 48$$

$$60 : 24$$

$$250 : 114$$

$$\Rightarrow \text{required ratio} = 125 : 57$$

128.(c)

$$\begin{array}{cc} M & W \\ 5_{\times 1} : 4_{\times 1} = 9_{\times 1} & \updownarrow 5 : 4 = 9 \\ 7_{\times 2} : 2_{\times 2} = 9_{\times 2} & \updownarrow 14 : 4 = 18 \end{array}$$

$$\Rightarrow \text{required ratio} = 19 : 8$$

(Ratio of contents in a mixture
remains same whatever be the
quantity)

129.(d) Milk left in the vessel af-
ter two process

$$= 60 \times \frac{5}{6} \times \frac{5}{6} \quad \left[\because \frac{10}{60} = \frac{1}{6} \right]$$

$$= \frac{125}{3} \text{ litre}$$

After adding 60 litre milk the
quantity of milk in the vessel

$$= \frac{125}{3} + 60 = \frac{180 + 125}{3}$$

Now, total mixture = 120 litre
After last process milk left in

$$\text{the vessel} = \frac{305}{3} \times \frac{11}{12} = \frac{3355}{36}$$

Water in the vessel in the last

$$= 120 - \frac{3355}{36} = \frac{965}{36}$$

$$\text{Required} = \frac{3355}{36} : \frac{965}{36}$$

$$= 671 : 193$$

130.(d) C A T Z I

$$\text{Ist alloy} \quad 8 : 7 : 5 = 20$$

$$\text{IInd alloy} \quad 6 : 4 : 2 = 12$$

$$\text{IIIrd alloy} \quad 5 : 3 = 8$$

Multiplying (i), (ii) and (iii) by 6,
10 and 15

$$C \quad A \quad T \quad Z \quad I$$

$$48 : 42 : 30 = 120$$

$$60 : 40 : 20 = 120$$

$$75 : 45 = 120$$

$$48 : 177 : 70 : 45 : 20 = 360$$

$\Rightarrow$ required percentage

$$= \frac{177}{360} \times 100 = 49.17\%$$

131.(d) As discussed earlier in
previous question

$$150x + 150y = 1050$$

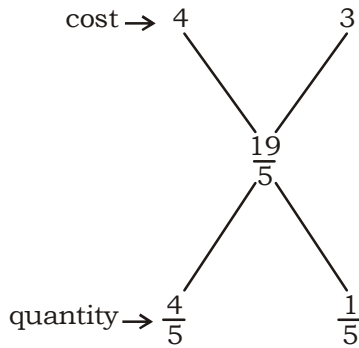
$$\Rightarrow x + y = 7$$

$\Rightarrow$ per gram rates of x and $y =$
4 and 3 and per

gram cost of the article is

$$\frac{570}{150} = \frac{19}{5}$$

Now by alligation method,



$$\Rightarrow 4 : 1$$

$\Rightarrow$ Required quantities are 120 gm and 30 gm respectively

132. (c)

	M	W	M	W
Initially	5	7	12	
After taking out	5	7	12	$\Rightarrow 5:7$
Final	1×5	3×5	4×5	$\Rightarrow 5:15$

8 units = 24 litres

20 units = 60 litres

Hence total initial quantity of the mixture = 60 litres

133. (a)

	M	W	M	W
Initially	5×4	4×4	9×4	$\Rightarrow 20:16$
Final	4×5	5×5	9×5	$\Rightarrow 20:25$

Now 36 units $\rightarrow$ 81 litre

$$9 \text{ units} \rightarrow \frac{81}{4} \text{ litre}$$

Hence the quantity of water to

be added = $\frac{81}{4}$ litre = $20\frac{1}{4}$ litre

$$134. (b) \begin{array}{l} A : W \\ 13 : 37 = 50 \dots (i) \\ 9 : 11 = 20 \dots (ii) \end{array}$$

since both types are mixed in the ratio of

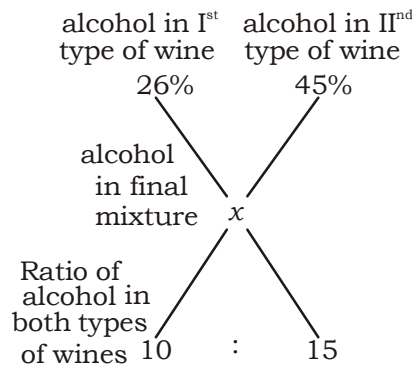
$10 : 15 = 2 : 3$

multiply (i) by 4 and (ii) by 15 we get

$$\begin{array}{l} A : W \\ 52 : 148 = 200 \\ \underline{135 : 165} = 300 \\ 187 : 313 = 500 \end{array}$$

$$\Rightarrow \text{required \%} = \frac{187}{500} \times 100 = 37.4\%$$

Alternatively:-



The required percentage

$$\begin{aligned} &= \frac{10 \times 26 + 15 \times 45}{10 + 15} = \frac{260 + 675}{25} \\ &= \frac{935}{25} = 37.4\% \end{aligned}$$

135. (c)

	Milk	Water
Ratio initially	4	5
Ratio after removal	4	5
Ratio after adding water	4	7
$\Rightarrow$ 1 unit $\rightarrow$	8	
9 units $\rightarrow$	72	

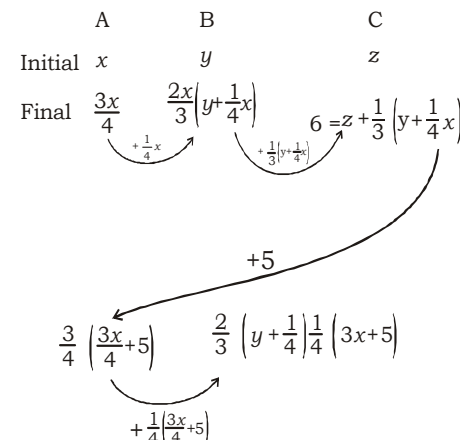
$\Rightarrow$ original quantity

= $72 + 18 = 90$ litres

136. (c) As the alloys A, B, C are being mixed 10 kg, 15kg and 50 kg resp. We have to make the ratio of their contents in the same ratio

	Copper	Tin	Nickel
A	80×10	15×10	5×10
B	75×15	15×15	10×15
C	70×50	25×50	5×50
	5425	1625	450
	217	65	18

137. (b)



Note: [In the last C would have left with 11 litre

milk out of which $\frac{5}{11}$ th part (i.e. 5 litre) is poured into A leaving 6 litre milk in vessel C]

Now we can say,

$$\begin{aligned} \frac{3}{4} \left(\frac{3x}{4} + 5 \right) &= 6 \\ \Rightarrow x &= 4 \text{ litre} \end{aligned}$$

$$\begin{aligned} \frac{2}{3} \left(y + \frac{1}{4}x \right) + \frac{1}{4} \left(\frac{3x}{4} + 5 \right) &= 6 \\ \Rightarrow y &= 5 \text{ litre} \end{aligned}$$

$$\text{And } z + \frac{1}{3} \left(y + \frac{1}{4}x \right) = 6$$

$$\Rightarrow z = 9 \text{ litre}$$

Alternatively:-

we can easily go through option also.

138. (a) While solving this type of question by Alligation rule, take any one constituent of all ratios and calculate the required ratio as follow - Taking the part of milk,

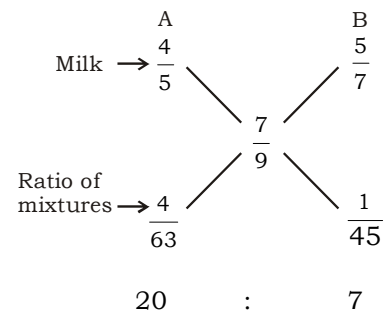
$$\text{Part of milk in A} = \frac{4}{5}$$

$$\text{Part of milk in B} = \frac{5}{7}$$

Part of milk in the new mixture

$$= \frac{7}{9}$$

Now by alligation rule.



Hence the required ratio is 20 : 7

139. (d)

$$\begin{array}{l} \text{Old} \rightarrow \frac{\text{milk}}{7} : \frac{\text{water}}{2} = 9 \\ \text{New} \rightarrow 7 : 3 \xrightarrow{+1} = 10 \\ \text{Since } 9 \rightarrow 729 \text{ ml} \\ 1 \rightarrow 81 \text{ ml} \end{array}$$

Hence 81 ml water should be added to the mixture to get required ratio.

140. (c) This question can be done by measuring the percentage of milk in each vessel in comparison of water.

Percentage of milk in first

$$\text{vessel} = \frac{5}{8} \times 100$$

$$= 62.5 \%$$

percentage of milk in second

$$\text{vessel} = \frac{2}{3} \times 100 = 66 \frac{2}{3} \%$$

Percentage of milk in third

$$\text{vessel} = \frac{3}{5} \times 100 = 60\%$$

Percentage of milk in fourth

$$\text{vessel} = \frac{7}{11} \times 100 = 63 \frac{7}{11} \%$$

Hence the third vessel contains least milk in comparison of water.

141. (a) Solving the question as question number 49.

We will solve the question on milk constituent of all ratio

$$\text{Part of milk in First glass} = \frac{3}{8}$$

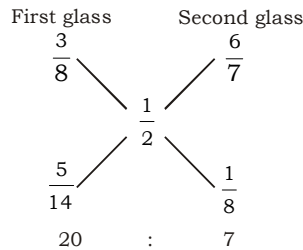
Part of milk in second glass

$$= \frac{6}{7}$$

Part of milk in the new mixture

$$= \frac{1}{2}$$

Now by mixture & alligation method



Hence the required ratio is 20 : 7

142. (d)

$$\begin{array}{l} \text{Water} \quad \text{Milk} \\ A \rightarrow 3_{\times 8} : 4_{\times 8} = 24 : 32 \\ B \rightarrow 5_{\times 7} : 3_{\times 7} = 35 : 21 \\ \text{New mixture} \quad 24+35 : 32+21 \\ \quad \quad \quad 59 : 53 \end{array}$$

Hence the required ratio is 59 : 53

143. (d)

$$\begin{array}{l} \text{Milk} \quad \text{Water} \\ \text{Old} \rightarrow 5 : 3 = 8 \\ \text{New} \rightarrow 4 : 4 = 8 \end{array} \xrightarrow{-1} \text{same}$$

Note: Always remember to answer this type of question the part taken out is given by

Part of mixture taken out

$$= \frac{\text{part of greater constituent taken out}}{\text{part of the greater constituent in the old mixture}}$$

Hence the required part of the

$$\text{mixture taken out} = \frac{1}{5}$$

144. (b)

$$\begin{array}{l} \text{Wine} \quad \text{Water} \\ \text{Old} \rightarrow 3 : 1 = 4 \\ \text{New} \rightarrow 2 : 2 = 4 \end{array} \xrightarrow{-1} \text{same}$$

$$\text{Hence the required ratio} = \frac{1}{3}$$

[for detailed solution see the question number 6]

145. (b) Since the quantity of water is unchanged in both the mixture so,

$$\begin{array}{l} \text{Acid} \quad \text{Water} \quad \text{Acid} \quad \text{Water} \\ 1_{\times 2} : 3_{\times 2} = 4_{\times 2} \Rightarrow 2 : 6 = 8 \\ 1_{\times 3} : 2_{\times 3} = 3_{\times 3} \Rightarrow 3 : 6 = 9 \\ 1 \text{ unit} \longrightarrow 5 \text{ litre} \\ 8 \text{ units} \longrightarrow 40 \text{ litre} \end{array}$$

Hence the initial quantity of mixture = 40 litre

$$146. (b) 20\% = \frac{1}{5}$$

Impurity in old mixture

$$= \frac{1}{5} \times 50 = 10 \text{ litre}$$

Since, the quantity of impurity is constant

So, 5% of new mixture = 10 litre

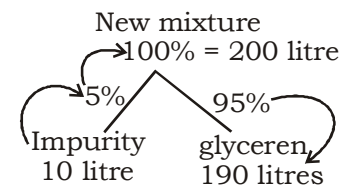
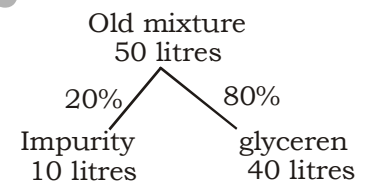
$$\Rightarrow 100\% \text{ of the new mixture}$$

= 200 litre

quantity of glyceren in the new mixture = 200 - 10 = 190 litre

Quantity to be added = 190 - 40 = 150 litres

Alternatively :-



Quantity of glyceren to be added = 190 - 40 = 150 litres

147. (c)

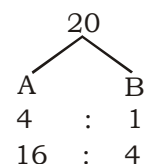
$$\begin{array}{l} \text{old ratio} \quad A \quad B \\ \quad \quad \quad 4 : 1 \\ \text{Ratio after taking} \\ \text{out 10 litre liquid} \\ \text{same} \quad 4 : 1 \xrightarrow{+5} = 5 \\ \text{New ratio} \quad 4 : 6 \xrightarrow{+5} = 10 \end{array}$$

Since, Total quantity of mixture initially = Total quantity of mixture in the last

$$\text{Now 5 units} \longrightarrow 10 \text{ litres}$$

$$10 \text{ units} \longrightarrow 20 \text{ litres}$$

Hence the total initial quantity of mixture = 20 litre



Quantity of A initially = 16 litres

$$148.(b) 16\frac{2}{3}\% = \frac{1}{6} \leftarrow \text{Profit}$$

$$\frac{1}{6} \leftarrow \text{cost}$$

Profit is only made by adding water and we know that the profit is calculated on the cost of sold quantity hence we can say 6 units represents cost of milk and 1 unit represent the water added.

So, in the mixture

$$\Rightarrow \frac{1}{6} \leftarrow \text{water}$$

$$\frac{6}{6} \leftarrow \text{milk}$$

Water	Milk	
1	6	= 7
$\downarrow \times 2$	$\downarrow \times 2$	$\downarrow \times 2$
<u>2</u>	<u>12</u>	<u>14</u>

Hence quantity of water in the mixture = 2 litre

149.(c) This is obvious that the quantity of milk in old mixture and new mixture will be same

Milk	Water	
Old $7_{\times 3}$	$1_{\times 3} = 8_{\times 3}$	
New $3_{\times 7}$	$1_{\times 7} = 4_{\times 7}$	

Milk	Water	
$\Rightarrow 21$	3	$= 24$
	$\swarrow +4$	
21	7	$= 28$

Since 24 units $\rightarrow$ 40 litre

$$4 \text{ units} \rightarrow \frac{40}{6} = 6\frac{2}{3} \text{ litres}$$

150.(b)

	Zinc	copper	Tin	lead	
First alloy	$2_{\times 2}$	$3_{\times 2}$	$1_{\times 2}$		$= 6_{\times 2}$
Second alloy		5	4	3	$= 12$
New alloy	4	11	6	3	$= 24$

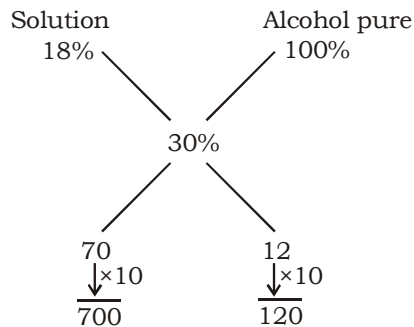
Part of lead in the new mixture

$$= \frac{3}{24} = \frac{1}{8}$$

Hence the quantity of lead in 154.(b)

$$1 \text{ kg of new alloy} = \frac{1}{8} \text{ kg}$$

151.(b) By alligation method



Hence required quantity of pure alcohol to be added = 120 ml.

152.(a) Let the initial quantity of milk be x

Then the quantity left after

$$\text{third time} = x \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}x$$

Required percentage

$$= \frac{1}{\frac{8x}{x}} \times 100 = 12.5\%$$

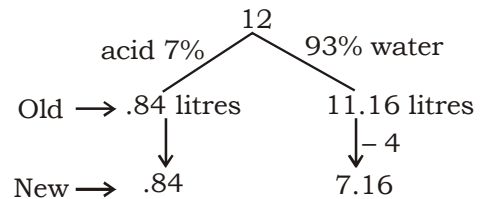
153.(a)

M	W		M : W
Old $5_{\times 3}$	$3_{\times 3} = 8_{\times 3}$	$\Rightarrow 15 : 9$	$= 24$
New $3_{\times 5}$	$5_{\times 5} = 8_{\times 5}$	$\Rightarrow 15 : 25$	$= 40$
		$\swarrow +16$	
24 units		$\rightarrow$	48 litres

$$16 \text{ units} \rightarrow 16 \times \frac{48}{24}$$

= 32 litres

Note:- Since the quantity of milk in old and new mixture is same Hence the required quantity of water = 32 litre.



$$\text{New percentage} = \frac{.84}{7.16} \times 100$$

$$= 11.73\%$$

155.(a) **Note :-** In both the mixtures the quantity of water will be same

M	W		M : W
Old 3	2 = 5	$\Rightarrow$	3 : 2 = 5
		$\swarrow +1$	
New $2_{\times 2}$	$1_{\times 2} = 3_{\times 2}$	$\Rightarrow$	4 : 2 = 6

5 units $\rightarrow$ 80 litre

1 units $\rightarrow$ 16 litre

156.(a) As we have discussed earlier profit shows the quantity of water in the mixture.

Hence

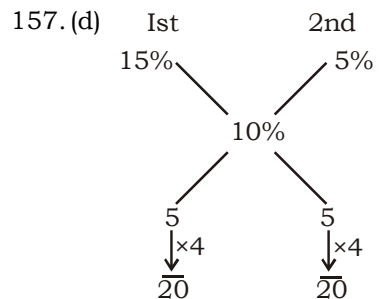
$$20\% = \frac{1}{5} \leftarrow \text{water}$$

$$\frac{1}{5} \leftarrow \text{milk}$$

1 units $\rightarrow$ 4 litres

5 units $\rightarrow$ 20 litres

Hence the quantity of pure milk = 20 litre



Hence required quantity = 20 litres.



06

RATION AND PROPORTION

Ratio

It is the comparison between two or more numbers. We can decide that one number is more or less than other by this ratio.

Ex :- $A : B = 3 : 4$ Here if the total amount is 7, then the value of A will be 3 and the value of B will be 4.

NOTE:- A is antecedent and B is consequent

So, we can find easily that B is more in amount than A.

Rule of Ratio

The comparison should always be done of the same quantity (of length, of weight etc.)

Properties of Ratio:

- (i) If the numerator and denominator is multiplied or divided by the

same number then the value of the ratio will not change.

Ex. $x : y$

by multiplying by a

$$\frac{x \times a}{y \times a} = \frac{xa}{ya}$$

- (ii) $x : y$

by dividing it by a

$$\frac{x}{y} = \frac{x/a}{y/a}$$

Proportion

When the values of two ratios are equal, then it is called proportion. It is denoted as $a : b :: c : d$

Here a and d are extremes and b and c are means.

Rule of Proportion :- if a, b, c and d are proportional.

1. $a : b :: c : d$

Then, $a \times d = b \times c$

Ex. if 7, 9, 21 and 27 are proportional then

$$7 : 9 :: 21 : 27$$

$$7 \times 27 = 9 \times 21$$

$$189 = 189$$

2. **Continued proportion :** If a, b, c are such that $a : b = b : c$ then these numbers are said to be in continued proportion.

then $a : b = b : c$

$$b^2 = a \times c$$

Ex. 3, 6 and 12 are continued proportion

then, $a : b = b : c$

$$3 : 6 = 6 : 12$$

$$b^2 = a \times c$$

$$(6)^2 = 3 \times 12$$

$$36 = 36$$

Examples

1. Find the third proportional to the numbers 3 and 6.

- (a) 21 (b) 1.5
(c) 18 (d) 12

Sol. (d) We know that,

$$\text{Third Proportional} = \frac{b^2}{a}$$

Where, $a = 3$

$b = 6$

then,

$$\Rightarrow \frac{6 \times 6}{3} = 12$$

2. Two numbers are in the ratio 9 : 11. If sum of these two numbers is 660, find the difference between the numbers.

- (a) 66 (b) 56
(c) 46 (d) 76

Sol. (a) Let the two numbers be $9x$, $11x$

According to the question

$$\text{Sum} \rightarrow 9x + 11x = 660$$

$$20x = 660$$

$$x = 33$$

$$\text{Difference} = 11x - 9x$$

$$= 2x = 2 \times 33$$

$$= 66$$

3. A bag contains an equal number of 50- paise, 25 paise, 20 paise and 5 paise coins respectively. If the total amount is ₹ 40, how many coins of each type are there?

- (a) 40 (b) 25
(c) 30 (d) 20

Sol. (a) According to the question,

$$50P : 25P : 20P : 5P$$

$$\text{Total paise} = 100P$$

$$\text{Total ₹} \rightarrow ₹ 1$$

$$1 \text{ unit} = ₹ 40$$

$$= 40$$

4. Two vessels contain equal quantity of mixtures of milk and water in the ratio 8 : 9 and 12 : 5 respectively. Both the mixtures are now mixed thoroughly. Find the ratio of milk to water in the new mixture so obtained.

- (a) 7 : 10 (b) 13 : 21
(c) 21 : 13 (d) 10 : 7

**Sol.** (d)

$$\begin{array}{cc}
 \text{I} & \text{II} \\
 \text{Milk : Water} & \text{Milk : Water} \\
 8 : 9 = 17 & 12 : 5 = 17 \\
 \text{Milk} & \text{Water} \\
 \boxed{8+12} : \boxed{9+5} & \\
 20 : 14 & \\
 10 : 7 &
 \end{array}$$

Therefore, Ratio of milk to water in the new Mixture = 10 : 7

5. The contents of two vessels containing water and milk are in the ratio 2:3 and 4:5 are mixed in the ratio 1:2. The resulting mixture will have water and milk in the ratio.

- (a) 77 : 58 (b) 58 : 77
(c) 68 : 77 (d) 77 : 68

Sol. (b) water : Milk

$$\begin{array}{l}
 \text{I} \quad (2 : 3)_{\times 9} = 5 \xrightarrow{9 \times 1} 45 \\
 \text{II} \quad (4 : 5)_{\times 10} = 9 \xrightarrow{5 \times 2} 45
 \end{array}$$

After equating the capacity of vessels new Ratio of water and milk water is to milk = 18 + 40 : 27 + 50 = 58 : 77

6. The sum of three numbers is 105. If the ratio between the first and second be 2 : 3 and that between the second and third be 4 : 5, then find the second number.

- (a) 35 (b) 24
(c) 36 (d) 45

Sol. (c) According to the question

$$I + II + III = 105$$

$$\begin{array}{ccc}
 I & : & II & : & III \\
 2 & : & 3 & : & 3 \\
 \underline{4} & & 4 & : & 5 \\
 8 & : & 12 & : & 15
 \end{array}$$

$$8 + 12 + 15$$

$$35 \text{ units} = 105$$

$$1 \text{ unit} = 3$$

$$\text{IInd no. is} = 12 \times 3 = 36$$

7. A hound pursues a hare and takes 6 leaps for every 7 leaps of the hare, but 5 leaps of the hound are equal to 6 leaps of the hare. Compare the rates of the hound and the hare.

- (a) 36 : 35 (b) 35 : 34
(c) 34 : 33 (d) 33 : 32

Sol. (a) According to the question,

$$\begin{array}{cc}
 \text{Times} \rightarrow & 6 \text{ leaps} & 7 \text{ leaps} \\
 & \curvearrowright & \\
 \text{Distance} \rightarrow & 6 \text{ leaps} & 5 \text{ leaps} \\
 & \hline & \hline
 & 36 & : & 35
 \end{array}$$

8. In 28 litres mixture of milk and water, the ratio of milk and water is 5 : 2. How much water should be added in the mixture so that the ratio of milk to water becomes 2 : 5?

- (1) 42 litres (2) 32 litres
(3) 24 litres (4) 39 litres

Sol. (a) According to the question,

$$\begin{array}{l}
 \text{Milk : Water} \\
 \text{Old } 2 \times (5 : 2) \\
 5 \times (2 : 5) \\
 \text{New } 10 : 4 \quad 21 \text{ units} \\
 10 : 25
 \end{array}$$

Initial Amount of mixture

$$= 14 \text{ units} \rightarrow 28 \text{ litres}$$

$$= 1 \text{ unit} \rightarrow 2$$

$$= 21 \text{ units} \rightarrow 42 \text{ litres}$$

9. A mixture contains milk and water in the ratio 9 : 4. On adding 4 litres of water, the ratio of milk to water becomes 3 : 2. Find the total quantity of the original mixture.

- (a) 26 litres (b) 18 litres
(c) 10 litres (d) 30 litres

Sol. (a) According to the question,

$$\begin{array}{l}
 \text{Milk : Water} \\
 \text{old } 9 : 4 \\
 \downarrow 3 \times (3 : 2) \\
 \text{New } 9 : 4 \quad 2 \text{ units} \rightarrow 4 \text{ litres} \\
 9 : 6 \quad 1 \text{ unit} \rightarrow 2 \text{ litres}
 \end{array}$$

$$\begin{array}{l}
 \text{Initial mixture} = (9 + 4) = 13 \\
 \text{units} = 13 \times 2 = 26 \text{ litres}
 \end{array}$$

10. The ratio of two numbers is 15:7. If each number be decreased by 2, the two numbers are in the ratio 7:3.

- (a) 15,7 (b) 30,14
(c) 45,21 (d) 60,28

Sol. (b) According to the question

No. are 15a and 7a

Now reducing 2 from each

$$\frac{15a-2}{7a-2} = \frac{7}{3}$$

on cross multiplication

$$45a - 6 = 49a - 14$$

$$8 = 4a$$

$$a = 2$$

$$\text{No. becomes } 15 \times 2, 7 \times 2 \\ 30, 14$$

11. A mixture contains milk and water in the ratio 9 : 4. On adding 8 litres of water, the ratio becomes 3 : 2. Find the total quantity of the original mixture.

- (a) 52 litres (b) 26 litres
(c) 104 litres (d) 30 litres

Sol. (a) Milk : Water

$$\text{Old } 9 : 4$$

$$3 \times (3 : 2)$$

New

$$\begin{array}{l}
 9 : 4 \\
 9 : 6 \quad 2 \text{ units} \rightarrow 8 \text{ litres}
 \end{array}$$

$$1 \text{ unit} \rightarrow 4 \text{ litres}$$

$$\text{Initial mixture} = 9 + 4$$

$$= 13 \text{ units}$$

$$= 13 \times 4$$

$$= 52 \text{ litres}$$

12. The ratio of incomes of two persons is 5:3 and that of their expenditures is 9:5. find the income of each person, if they save ₹ 1300 and ₹ 900 respectively.

- (a) ₹ 4,000, ₹ 2,400
(b) ₹ 3,000, ₹ 1,800
(c) ₹ 4,000, ₹ 2,400
(d) ₹ 4,500, ₹ 2,700

Sol. (a) A : B

$$\text{Income } 5 : 3$$

$$\text{Exp. } 9 : 5$$

$$\text{Saving } 1300 : 900$$

$$\Rightarrow \frac{5x-1300}{3x-900} = \frac{9}{5}$$



$$\Rightarrow 25x - 6500 = 27x - 8100$$

$$2x = 1600$$

$$x = 800$$

$$\Rightarrow \text{Income of A \& B are}$$

$$A = 5x = 5 \times 800 = ₹ 4000$$

$$B = 3x = 3 \times 800 = ₹ 2400$$

13. If $\frac{1}{x} : \frac{1}{y} : \frac{1}{z} = 2 : 3 : 5$, then

$$x : y : z = ?$$

(a) 2 : 3 : 5 (b) 15 : 10 : 6

(c) 5 : 3 : 2 (d) 6 : 10 : 15

Sol. (b) $\therefore \frac{1}{x} : \frac{1}{y} : \frac{1}{z} = 2 : 3 : 5$

$$\therefore x : y : z = \frac{1}{2} : \frac{1}{3} : \frac{1}{5}$$

Multiply by 30 (LCM of 2, 3, 5)

$$x : y : z = \frac{1}{2} \times 30 : \frac{1}{3} \times 30 : \frac{1}{5} \times 30$$

Then, $x : y : z$
15 : 10 : 6

14. Divide Rs. 1870 into three parts in such a way that half of the first part, one third of second and one-sixth of the third part are equal :

(a) 340, 510, 1020

(b) 400, 800, 670

(c) 470, 640, 1160

(d) None of these

Sol. (a) $A \times \frac{1}{2} = B \times \frac{1}{3} = C \times \frac{1}{6}$

$$\frac{A}{2} = \frac{B}{3} = \frac{C}{6}$$

$$A : B : C = 2 : 3 : 6$$

$$2x + 3x + 6x = 1870$$

$$11x = 1870$$

$$x = 170$$

$$A = 2 \times 170 = 340$$

$$B = 3 \times 170 = 510$$

$$C = 6 \times 170 = 1020$$

15. In a mixture of 40 litres, the ratio of milk and water is 4 : 1. How much water must be added to this mixture so that the ratio of milk and water becomes 2 : 3.

(a) 20 litres

(b) 32 litres

(c) 40 litres

(d) 30 litres

Sol. (c)

	Milk	:	Water
before	4	:	1
now	2×2	:	3×2
	4	:	6

$$5 \text{ Units} = 40 \text{ litres}$$

$$\text{water to be added} = 5 \text{ units}$$

$$= 40 \text{ litres}$$

16. A and B are two alloys of argen-tum and brass prepared by mix-ing metals in proportions 7 : 2 and 7 : 11 respectively. If equal quantities of the two alloys are melted to form a third alloy C, the proportion of argen-tum and brass in C will be:

(a) 5 : 9

(b) 5 : 7

(c) 7 : 5

(d) 9 : 5

Sol. (c)

	Argentum	:	Brass
A	7×2	:	2×2 [9 × 2 = 18]
	14	:	4
B	7	:	11 [18]

for equal quantities multiply A by 2

Then the ratio in alloy C

Argentum	:	brass
(14 + 7)	:	(4 + 11)
21	:	15
7	:	5

17. The students in three batches at AMS Careers are in the ratio 2 : 3 : 5. If 20 students are increased in each batch, the ratio changes to 4 : 5 : 7. The total number of students in the three batches before the increase were:

(a) 10

(b) 90

(c) 100

(d) 150

Sol. (c)

Ratio of students in Batches

I	II	III
2	3	5
$\downarrow + 2$	$\downarrow + 2$	$\downarrow + 2$
4	5	7

New Ratio

$$\text{Here 2 Units} = 20$$

$$\text{then students before} = (2 + 3 + 5) \times 10 = 100$$

18. After an increment of 7 in both the numerator and denominator, a fraction changes to $\frac{3}{4}$. Find the original fraction :

(a) $\frac{5}{12}$

(b) $\frac{7}{9}$

(c) $\frac{3}{8}$

(d) can't be determined

Sol. (d) Let Original fraction = $\frac{p}{q}$

from the question,

$$= \frac{p+7}{q+7} = \frac{3}{4}$$

$$4p + 28 = 3q + 21$$

So we can not find the value of p and q can't be determined.

19. The present ratio of A and B is 4 : 5. 18 years ago, this ratio was 11 : 16. Find the sum of their present ages :

(a) 90 years

(b) 105 years

(c) 110 years

(d) 80 years

Sol. (a) Ratio of age

$$\begin{array}{l} \text{Present} \quad 4 : 5 \times 5 \\ 18 \text{ yrs before} \quad 11 : 16 \times 1 \end{array} \left(\begin{array}{l} \text{To make} \\ \text{the differ-} \\ \text{ence equal} \end{array} \right)$$

Now,

	A	:	B
Present	20	:	25
18 yrs before	11	:	16

$$9 \text{ Units} = 18$$

$$1 \text{ unit} = 2$$

Sum of present age

$$= (20 + 25) \times 2 = 90 \text{ years}$$

20. A beggar had ten paise, twenty paise and one rupee coins in the ratio 10 : 17 : 7 respectively at the end of the day. If that day he earned a total of Rs. 57, how many twenty paise coins did he have ?



(a) 114 (b) 171

(c) 95 (d) 85

Sol. (d) 10P : 20P : 1Rs
10 : 17 : 7

Value of coins

1Rs + 3.4Rs + 7Rs. = 57

11.4 Rs. = 57

1 Re. = 5

Therefore, he has 20 paise coins
= $17 \times 5 = 85$

21. Find the value of x in the following proportion $27 : 72 :: x : 8$

(a) 5 (b) 7

(c) 3 (d) none of these

Sol. (c)

A	B	C	D
27	72	:: x	8

 $A \times D = B \times C$ $27 \times 8 = 72 \times x$ $x = 3$

22. Two alloys contain zinc and copper in the ratio of 2 : 1 and 4 : 1. In what ratio the two alloys should be added together to get as new alloy having zinc and copper in the ratio of 3 : 1?

(a) 7 : 5 (b) 5 : 7

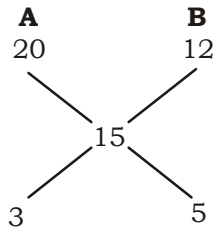
(c) 3 : 5 (d) none of these

Sol. (c) $\frac{A}{\frac{2}{3}} = \frac{B}{\frac{4}{5}}$

$\frac{1}{20}$	$\frac{3}{4}$	$\frac{1}{12}$
A	:	B
3	:	5

Alternatively:-

	Zinc	Copper	
Alloy A	2	: 1	$\times 20$
Alloy B	4	: 1	$\times 12$
Alloy C	3	: 1	$\times 15$
			60



23. If two numbers are in the ratio 6 : 13 and their least common multiple is 312, the sum of the numbers is :

(a) 75 (b) 57

(c) 76 (d) 67

Sol. (c) A : B

6 : 13

Let HCF = x Then LCM = $x \times 6 \times 13$ $312 = 78x$ $x = 4$

Sum of the numbers = $6x + 13x$
= $x(6 + 13)$
= 4×19
= 76

24. Rs. 770 have been divided among A, B and C such that A receives $\frac{2}{9}$ th of what B and C together receive. Then A's share is :

(a) Rs. 140 (b) Rs. 154

(c) Rs. 165 (d) Rs. 170

Sol. (a) $A = \frac{2}{9}(B + C)$

A	:	(B + C)
2	:	9

Share of A = $770 \times \frac{2}{11} = 140$

25. What least number must be subtracted from each of the numbers 14, 17, 34 and 42 so that the remainders are proportional?

(a) 0 (b) 1

(c) 2 (d) 7

Sol. (c) Let that no. = x then $\frac{14-x}{17-x} = \frac{34-x}{42-x}$ after solving $x = 2$

26. Two numbers are in the ratio of 1 : 2. If 7 is added to both, their ratio changes to 3 : 5. The greater number is :

(a) 20 (b) 24

(c) 28 (d) 32

Sol. (c)

A	:	B	
1	:	2	$\times 2$ to make the difference
New Ratio 3	:	5	$\times 1$ equal
	:	2	

A	:	B
2	:	4
3	:	5

1 Unit = 7

greater no. 4 Units = $7 \times 4 = 28$

27. If one star equals four circles and three circles equal four diamonds, then what is the ratio of star : diamond ?

(a) $3/16$ (b) $1/19$ (c) $3/4$ (d) $16/3$ **Sol.** (d) 1 star = 4 circle

star : circle

 $4_{\times 4} : 1_{\times 4}$

3 circle = 4 diamonds

circle : diamonds

4 : 3

Then the ratio

Star : Circle : Diamonds

16 : 4 : 3

So, $\frac{\text{star}}{\text{diamond}} = \frac{16}{3}$

28. From each of two given numbers, half the smaller number is subtracted. Of the resulting numbers the larger one is three times as larger as the smaller. What is the ratio of the two numbers ?

(a) 2 : 1 (b) 1 : 2

(c) 3 : 2 (d) 3 : 4

Sol. (b) Let smaller no. = A
larger no. = B

 $\left(A - \frac{A}{2}\right)3 = \left(B - \frac{A}{2}\right)$ $\frac{3A}{2} = \frac{2B - A}{2}$

8A = 4B

A : B

1 : 2

29. In a wallet the ratio of 25 paise, 50 paise and Rs. 1 coins are in the ratio of 12 : 4 : 3, which amounts to Rs. 600. Find the no. of coins of 25 paise :

(a) 500 (b) 900

(c) 700 (d) 850



Sol. (b) 25P : 50P : 1Rs.

$$12 : 4 : 3$$

Ratio of values in Rupees is

$$25P : 50P : 1Rs.$$

$$3 : 2 : 3$$

$$8 \text{ units} = 600$$

$$\text{Then } 3 \text{ units} = \frac{600}{8} \times 3 = 225$$

So, number of 25 paise coins will be = $225 \times 4 = 900$ coins

30. x - varies directly as y and x varies inversely as the square of z . When $y = 75$ and $x = 6$, then $z = 5$. Find the value of x when $y = 24$ and $z = 4$:

- (a) 1 (b) 2
(c) 3 (d) 4

Sol. (c) $x \propto y$

$$x \propto \frac{1}{z^2}$$

$$\text{So, } x \propto \frac{y}{z^2}$$

$$K = \frac{x \times z^2}{y}$$

Now put values

$$K = \frac{6 \times 25}{75} \quad K = 2$$

Now,

$$K = \frac{x \times z^2}{y}$$

$$2 = \frac{x \times 16}{24}$$

$$x = 3$$

31. The cost of the marble varies directly with square of its weight. Marble is broken into 3 parts whose weights are in the ratio 3 : 4 : 5. If marble had been broken into three equal parts by

weight then there would have been a further loss of Rs. 1800. What is the actual cost of the original (or unbroken) marble ?

- (a) Rs. 3600 (b) Rs. 10,800
(c) Rs. 2160 (d) none of these

Sol. (d)

$$\text{cost} \propto (\text{wt.})^2$$

$$\text{total wt.} = 3 + 4 + 5 = 12$$

$$\text{its cost} = (3)^2 + (4)^2 + (5)^2 = 50$$

$$\text{three equal parts} = \frac{12}{3} = 4$$

$$\text{its cost} = (4)^2 + (4)^2 + (4)^2 = 48$$

$$\text{loss} = 50 - 48 = 2$$

$$2 \text{ Units} = 1800$$

$$\text{Cost of unbroken marble} = (12)^2 = 144$$

$$\text{So, } 2 \text{ Units} = 1800$$

$$144 \text{ units} = \frac{1800}{2} \times 144 = 129600$$

32. The value of diamond is directly proportional to the square of its weight. A diamond unfortunately breaks into three pieces with weights in the ratio of 3 : 4 : 5 thus a loss of Rs. 9.4 lakh is incurred. What is the actual value of diamond:

- (a) 28.8 lakh (b) 13.5 lakh
(c) 14.4 lakh (d) 18.8 lakh

Sol. (c) Value $\propto (\text{wt.})^2$

$$\text{Total wt.} = 3 + 4 + 5 = 12$$

$$\text{Therefore its value} = (12)^2 = 144$$

$$\text{after broken its value} = (3)^2 + (4)^2 + (5)^2 = 50$$

$$\text{loss} = 144 - 50 = 94$$

$$94 \text{ units} = 9.4 \text{ lakh}$$

$$\text{Then its value (144 Units)}$$

$$= \frac{9.4}{94} \times 144 = 14.4 \text{ lakhs.}$$

33. Let a , b , c , d and e be integers such that $a = 6b = 12c$, and $2b = 9d = 12e$. Then which of the following pairs contain a number that is not an integer?

- (a) $\left(\frac{a}{27}, \frac{b}{e}\right)$ (b) $\left(\frac{a}{36}, \frac{c}{e}\right)$

$$(c) \left(\frac{a}{12}, \frac{bd}{18}\right) \quad (d) \left(\frac{a}{7}, \frac{c}{d}\right)$$

Sol. (d) $a = 6b = 12c$

$$a : b : c$$

$$72 : 12 : 6$$

$$12 : 2 : 1$$

$$2b = 9d = 12e$$

$$b : d : e$$

$$108 : 24 : 18$$

$$18 : 4 : 3$$

$$a : b : c : d : e$$

$$108 : 18 : 9 : 4 : 3$$

Now go through options,

$$\left(\frac{a}{7}, \frac{c}{d}\right) = \left(\frac{108}{7}, \frac{9}{4}\right)$$

So it is not an integer.

34. The intensity of illumination on a surface from a source of light varies inversely as the square of the distance of the surface from the source. The effect of moving a piece of paper 3 times as far from the source is to :

- (a) Divide the intensity by 3
(b) Multiply the intensity by 9
(c) Divide the intensity by 9
(d) Multiply the intensity by 9

Sol. (c) $I \propto \frac{1}{d^2}$

$$Id^2 = K \text{ (constant)}$$

But if d becomes 3 times then,

$$I \propto \frac{1}{(3d)^2}$$

$$I \times 9d^2 = K$$

So we have to divide the intensity by 9

35. A piece of string is 40 centimeters long. It is cut into three pieces. The longest piece is 3 times as long as the middle-sized and the shortest piece is 23 centimeters shorter than the longest piece. Find the length of the shortest piece (in cm):

- (a) 27 (b) 5
(c) 4 (d) 9



Sol. (c) Let longest piece = $3x$ cm
then middle sized = x
and shortest = $3x - 23$
Now,

$$3x + x + 3x - 23 = 40$$

$$7x = 63$$

$$x = 9 \text{ cm}$$

So the length of shortest piece
= $3x - 23 = 3 \times 9 - 23 = 4 \text{ cm}$

Note:- checking through options will save your time

36. Two vessels contain milk & water in the ratio 7 : 5 and 7 : 9. If both vessels are mixed in ratio 1 : 1, find the ratio of milk and water in the new mixture.
(a) 15 : 49 (b) 61 : 53
(c) 49 : 47 (d) 39 : 29

Sol. (c)

M	:	W
7×4		$5 \times 4 \rightarrow 12 \times 4 \rightarrow 48$
7×3		$9 \times 3 \rightarrow 16 \times 3 \rightarrow 48$
$\frac{28+21}{49}$		$\frac{20+27}{47}$
49 : 47		

37. The ratio of expenditure of A, B and C is 16 : 12 : 9 and their total income is 1530. Find the share of B's income, if they save 20%, 25% and 40% of their income.

- (a) ₹ 300 (b) ₹ 480
(c) ₹ 450 (d) ₹ 500

Sol. (b) A : B : C

Exp:- 16 : 12 : 9 $\rightarrow$ 37

Income 20 : 16 : 15 $\rightarrow$ 51

saving of A = 20% $\rightarrow$ expenditure = 80%

$$\therefore \frac{\text{expenditure}}{\text{Income}} = \frac{4}{5} = \frac{16}{I}$$

$\Rightarrow$ Income of A = 20 Units

51 units = 1530

1 unit = 30

$\therefore$ Income of B = 30×16
= Rs. 480

38. ₹ 2366 is divided among 8 men, 10 women & 10 children. Each man get 25% more than each woman and each woman get 25% more than each child. Find the amount received by each women.

- (a) ₹ 67.6 (b) ₹ 105.625

- (c) ₹ 84.5 (d) ₹ 90

Sol. (c) M : W : C
5 : 4 : 4
5 : 5 : 4

$$25 \times 8 : 20 \times 10 : 16 \times 10$$

$$200 : 200 : 160$$

or, 5 : 5 : 4

14 units = 2366

$$\therefore \text{Man} = \frac{5}{14} \times 2366 = \text{Rs. } 845$$

$$\therefore \text{Each man} = \frac{845}{8}$$

$$= \text{Rs. } 105.625$$

$$\text{Each woman} = \frac{845}{10} = \text{Rs. } 84.5$$

$$\text{Each child} = \frac{676}{10} = \text{Rs. } 67.6$$

39. A boy and a girl playing with a pencil. The girl break the pencil in two parts and the boy observe that the ratio of length of these two parts is same as the ratio of length of pencil to the larger part. Find the ratio in which the girl break the pencil.

- (a) $\sqrt{5} - 1 : 2$ (b) $\sqrt{5} : 2$

- (c) $\sqrt{5} + 1 : 2$ (d) None

Sol. (c) $\frac{K}{K+1} = \frac{1}{K}$

$\Rightarrow$ length = $(k+1)$

Let the ratio be $k : 1$

$$\text{According to question, } \frac{k}{1} = \frac{k+1}{k}$$

$$\therefore k^2 = k+1 \text{ or } k^2 - k - 1 = 0$$

$$\therefore k = \frac{1 \pm \sqrt{5}}{2} = \frac{1 + \sqrt{5}}{2} \text{ (Length can not be in negative)}$$

$$\therefore \text{Ratio} = \sqrt{5} + 1 : 2 \text{ ans.}$$

40. The ratio of income of A & B is 3 : 2 and ratio of their expenditure is 4 : 3. If they save Rs. 2000 and Rs. 900. Find their income.
(a) 3600, 2400 (b) 3000, 2000
(c) 7200, 4800 (d) 6000, 4000

Sol. (c) A : B
Income 3k : 2k
Exp. 4 : 3

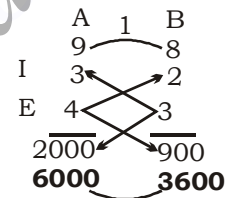
$$\therefore \frac{3k-2000}{2k-900} = \frac{4}{3}$$

$$\therefore 9k-8k = 6000-3600$$

$$\therefore k = 2400$$

$\therefore$ A- Rs. 7200, B-4800 Ans.

Alternate:-



1 unit = 2400

$\therefore$ A's income

= 3×2400

= Rs. 7200

B's income

= 2×2400

= Rs. 4800

41. ₹ 5625 is divided among A, B & C in such a way that A receive $\frac{1}{2}$ the sum of B+C. Find the amount received by A+B, if B receives $\frac{1}{4}$ of (A+C).

- (a) 3000 (b) 4000

- (c) 2500 (d) 3500

Sol. (a) $\frac{A}{B+C} = \frac{1}{2} = \frac{5}{10}$ and $\frac{B}{A+C}$

$$= \frac{1}{4} = \frac{3}{12}$$

3, 5 have LCM 15 which is the sum of both numerator and denominator, so both amount is same

$$\therefore A+B+C = 15 \Rightarrow A:B:C = 5:3:7$$

$$\therefore (A+B) = \frac{8}{15} \times 5625 = \text{Rs. } 3000$$



42. One year ago the ratio of income of A & B is 3 : 5. The ratio of their last year income to current year income is 2 : 3 and 4 : 5. If their total current year income is ₹ 4300. Find their present income individually.

- (a) ₹ 3000, 5000
(b) ₹ 5000, 7000
(c) ₹ 1800, 2500
(d) ₹ 2000, 3000

Sol. (c)

	A	B	
Last	3	5	
L : C	L : C		
2:3	4:5		
$\frac{3 \times 4}{12}$	$\frac{5 \times 4}{20}$		
6	5		
2:3	4:5		
↓6	↓5		
18	25		

→ LCM = 4(2,4)

$$\therefore A = \frac{18}{43} \times 4300 = \text{Rs. } 1800, B = \text{Rs. } 2500 \text{ ans.}$$

43. The price of gold is directly proportional to square of its weight. A person broke down the gold in the ratio of 3 : 2 : 1 and sold. He incurs a loss of of Rs. 4620. Find the initial price of gold.

- (a) ₹ 7500 (b) ₹ 8000
(c) ₹ 7560 (d) ₹ 7884

Sol. (c) Initial weight = 6, price = $6^2 = 36$

$$\text{New price} = 3^2 + 2^2 + 1^2 = 14$$

$$\therefore \text{Loss} = 36 - 14$$

$$= 22 \text{ units} = \text{Rs. } 4620$$

$$\therefore 1 \text{ unit} = \text{Rs. } 210$$

$$\therefore \text{Initial price} = 36 \times 210 = \text{Rs. } 7560$$

44. A is inversely proportional to the cube of B. If A = 3, then B = 2, but if A = 8/9 then B = ?

- (a) 3 (b) 4
(c) 5 (d) 6

Sol. (a) $A \propto \frac{1}{B^3}$

$$A = k \frac{1}{B^3}$$

$$3 = k \cdot \frac{1}{8} \Rightarrow k = 24$$

$$\therefore A = \frac{8}{9} = \frac{24}{B^3}$$

$$\Rightarrow B^3 = (3)^3 \Rightarrow B = 3$$

45. A bag contains ₹ 1, 50 p & 25 p coins and the ratio of there value is 30 : 11 : 7 and the total no. of coins are 480. Find the no. of 50 p coins.

- (a) 120 (b) 150
(c) 132 (d) 112

Sol. (c)

	1 Rs	50 P	25 P
value	30	11	7
coins	30	22	28

→ 80

$$\therefore 50 \text{ p. coins} = \frac{22}{80} \times 480 = 132$$

46. The ratio of age of Ram & Shyam 5 years ago was 2 : 3 and the ratio of their age after 5 years would be 3 : 4. Find the sum of their present ages.

- (a) 50 (b) 60
(c) 70 (d) 80

Sol. (b) R and S be their age

$$\frac{R-5}{S-5} = \frac{2}{3} \text{ and } \frac{R+5}{S+5} = \frac{3}{4}$$

$$R = 25, S = 35 \text{ satisfies both}$$

$$\therefore \text{Sum} = 60 \text{ ans.}$$

Alternate:-

	R	S
	20	30
-5	$\left(\begin{matrix} 2 \times 10 \\ 25 \end{matrix} \right)$	$\left(\begin{matrix} 3 \times 10 \\ 35 \end{matrix} \right)$
+5	$\left(\begin{matrix} 3 \times 10 \\ 35 \end{matrix} \right)$	$\left(\begin{matrix} 4 \times 10 \\ 40 \end{matrix} \right)$

$$1 \text{ unit} \rightarrow 10 \text{ years}$$

$$\therefore \text{their age before 5 years} = 20 + 30 = 50 \text{ years}$$

$$\text{Their present age is}$$

$$= 20 + 5 + 30 + 5 = 60 \text{ years}$$

47. The age of Ram is 4 times of his daughter. The age of Ram was 9 times of her daughter five years ago. Find their present ages.

- (a) 8, 32 (b) 7, 28
(c) 10, 40 (d) 12, 48

Sol. (a) Age of daughter be x and Ram's age be $4x$

$$\therefore \frac{4x-5}{x-5} = 9$$

$$\Rightarrow 4x-5 = 9x-45$$

$$x = 8$$

$$\text{Ram} = 8 \times 4 = 32 \text{ ans.}$$

Alternate:-

R	D	
27	3	
$\left(\begin{matrix} 9 \times 3 \\ 32 \end{matrix} \right)$	$\left(\begin{matrix} 1 \times 3 \\ 8 \end{matrix} \right)$	$\left(\begin{matrix} 8(9-1) \\ 3(4-1) \end{matrix} \right)$
Present	$\left(\begin{matrix} 4 \times 8 \\ 1 \times 8 \end{matrix} \right)$	

Difference = 5

$$5 \text{ units} = 5$$

$$1 \text{ unit} = 1$$

$$\text{Age of Ram} = 32 \text{ years}$$

$$\text{Age of daughter} = 8 \text{ years}$$

48. The ratio of income of A and B is 3 : 4. and each saves ₹ 200, find the income of A and B.

- (a) ₹ 3000, 4000
(b) ₹ 2500, 3500
(c) ₹ 3500, 4500
(d) Insufficient data

Sol. (d) A : B

$$I \quad 3x \quad 4x$$

$$S \quad 200 \quad 200$$

$$\frac{3x-200}{4x-200} = ?$$

Insufficient data

49. The ratio of income of A, B and C is 3 : 7 : 4 and the ratio of their expenditure is 4 : 3 : 5 respectively. If A saves ₹ 300 out of ₹. 2400, find the savings of C.

- (a) ₹ 500 (b) ₹ 575
(c) ₹ 600 (d) ₹ 650

Sol. (b)

$$A : B : C$$

I	3	7	4
	↓800	↓800	↓800
	2400	5600	3200



$$\begin{array}{ccc} \text{S} & 300 & \\ \text{E} & 2100 & \left(\frac{2100}{4} \times 5 \right) \\ \uparrow & \uparrow & \uparrow \\ 4 & 3 & 5 \end{array}$$

$$\text{expense of C} = \frac{5}{4} \times 2100$$

$$= \text{Rs. } 2625$$

$$\therefore \text{Saving of C} = 3200 - 2625$$

$$= \text{Rs. } 575$$

50. The ratio of incomes of two persons is 5 : 3 and that of their expenditures is 9 : 5. If they save

₹ 2600 and ₹ 1800 respectively, their incomes are

- (a) ₹ 5000, 3000
(b) ₹ 8000, 4800
(c) ₹ 10000, 6000
(d) ₹ 12000, 7200

Sol. (b) P1 : P2

$$\text{I} \quad 5x \quad 3x$$

$$\text{E} \quad 9y \quad 5y$$

$$\therefore (5x - 9y = 2600) \times 5 \text{ and}$$

$$(3x - 5y = 1800) \times 9$$

$$25x - 45y = 13000$$

$$27x - 45y = 16200$$

$$\therefore 2x = 3200 \Rightarrow x = 1600$$

$$\therefore \text{Incomes}$$

$$= \text{Rs. } \mathbf{8000}, \text{ Rs. } \mathbf{4800}$$

51. The ratio of two number's sums, difference and multiple is 11 : 1

: 90 respectively. Find the sums of their square.

- (a) 171 (b) 108
(c) 183 (d) 75

Sol. (c) Let no. be x only

$$\frac{x+y}{x-y} = 11$$

$$\Rightarrow x + y = 11x - 11y$$

$$\Rightarrow 10x = 12y \Rightarrow 5x = 6y$$

$$\frac{x}{y} = \frac{6}{5} \text{ and } xy = 90$$

$$\Rightarrow x \cdot \frac{5x}{6} = 90 \Rightarrow x^2 = 108$$

$$y \cdot \frac{y \times 6}{5} = 90$$

$$y^2 = 75$$

$$\therefore x^2 + y^2 = 183$$



Examples

1. Find the fourth proportional to the numbers 6, 8, 9.
(a) 12 (b) 7
(c) 5 (d) 14
2. A bag contains one rupee, 50-paise and 25-paise coins in the ratio 5 : 7 : 9. If the total amount in the bag is ₹ 430, find the number of coins of each kind.
(a) 200, 280, 360
(b) 280, 200, 360
(c) 360, 280, 200
(d) 360, 200, 280
3. One man adds 6 litres of water to 11 litres of milk and another man adds 9 litres of water to 8 litres of milk. What is the ratio of the strengths of milk in the two mixtures?
(a) 2:3 (b) 3 : 2
(c) 11 : 8 (d) 8 : 11
4. Two vessels contain equal quantity of mixtures of milk and water in the ratio 9:5 and 4:3 respectively. Both the mixtures are now mixed thoroughly. Find the ratio of milk to water in the new mixture so obtained.
(a) 17 : 11 (b) 11 : 17
(c) 8 : 13 (d) 13 : 8
5. The contents of two vessels containing water and milk are in the ratio 3 : 4 and 5 : 4 are mixed in the ratio 1 : 4. The resulting mixture will have water and milk in the ratio.
(a) 184 : 176 (b) 167 : 184
(c) 167 : 148 (d) 148 : 167
6. An amount of ₹ 950 is distributed among A, B and C in the ratio 5 : 11 : 3, what is the difference between the share of B and A?
(a) 550 (b) 250
(c) 200 (d) 300
7. The sum of three numbers is 275. If the ratio between the first and second be 3 : 7 and that between the second and third be 2 : 5, then find the second number.
(a) 30 (b) 175
(c) 70 (d) 80
8. If $A : B = 3 : 4$, $B : C = 5 : 7$ and $C : D = 3 : 5$, then find $A : B : C : D$.
(a) 9 : 21 : 12 : 28
(b) 45 : 60 : 84 : 140
(c) 9 : 12 : 28 : 21
(d) 9 : 12 : 21 : 82
9. A hound pursues a hare and takes 3 leaps for every 4 leaps of the hare, but 2 leaps of the hound are equal to 3 leaps of the hare. Compare the rates of the hound and the hare.
(a) 9 : 8 (b) 7 : 6
(c) 5 : 6 (d) 8 : 9
10. In a mixture of 60 litres, the ratio of milk and water is 2 : 1. If the ratio of milk and water is to be 1:2, then the amount of water to be further added is:
(a) 42 litres (b) 56 litres
(c) 60 litres (d) 77 litres
11. A mixture contains milk and water in the ratio 4 : 3. On adding 2 litres of water, the ratio becomes 8 : 7. Find the total quantity of the final mixture.
(a) 16 litres (b) 12 litres
(c) 28 litres (d) 30 litres
12. The incomes of A and B are in the ratio 9 : 4 and their expenditures are in the ratio 7 : 3 and the saving is ₹ 2000, what are their incomes?
(a) ₹ 90000, ₹ 4000
(b) ₹ 27000, ₹ 12000
(c) ₹ 72000, ₹ 16000
(d) ₹ 72000, ₹ 32000
13. A mixture contains milk and water in the ratio 4 : 3. On adding 6 liters of water the ratio becomes 8 : 7. Find the total quantity of the final mixture.
(a) 168 litres (b) 12 litres
(c) 42 litres (d) 90 litres
14. There is 81 litres pure milk in a container. One-third of milk is replaced by water in the container. Again one-third of mixture is extracted and equal amount of water is added. What is the ratio of milk to water in the new mixture?
(a) 1:2 (b) 1:1
(c) 2:1 (d) 4:5
15. Tom is chasing Jerry. In the same interval of time Tom jumps 8 times while Jerry jumps 6 times. But the distance covered by Tom in 7 jumps is equal to the distance covered by Jerry in 5 jumps. The ratio of speed of Tom and Jerry is
(a) 48:35 (b) 28:15
(c) 24:20 (d) 20:21
16. Three vessels each of 10 litres capacity contain a mixture of milk & water in the ratio 2 : 1, 3 : 1 and 3 : 2. If all the three vessels are emptied into a large vessel, find the ratio of milk and water in the new mixture.
(a) 101 : 111 (b) 121 : 59
(c) 53 : 37 (d) 31 : 13
17. Two vessels A & B contain a mixture of milk & water in the ratio 4 : 5 and 5 : 1. If both vessels are mixed in the ratio 5 : 2. Find the ratio of milk & water in new mixture.
(a) 3 : 2 (b) 5 : 3
(c) 5 : 4 (d) 2 : 1
18. A 2 kg metal of which $\frac{1}{3}$ is zinc and rest is copper mixed with 3 kg of metal of which $\frac{1}{4}$ is zinc and rest is copper. What is the ratio of zinc to copper in new mixture ?
(a) 17 : 43 (b) 15 : 13
(c) 21 : 19 (d) 27 : 31



19. Ratio of land and water on earth is 1 : 2 and ratio of land and water in northern hemisphere is 2 : 3. Find the ratio of Land and water in Southern hemisphere.
(a) 3 : 5 (b) 4 : 7
(c) 9 : 13 (d) 4 : 11
20. Rs. 5600 is to be divided among A, B, C & D in such a way that the ratio of share of A : B is 1 : 2, B : C is 3 : 1, C : D is 2 : 3. Find share of (A+B)
(a) ₹ 2400 (b) ₹ 3000
(c) ₹ 4000 (d) ₹ 3600
21. The total income of A, B and C is 6060. A spend 80%, B spend 85% and C spend 75% and the ratio of their saving is 5 : 6 : 9. Find the income of A.
(a) ₹ 1500 (b) ₹ 1200
(c) ₹ 1800 (d) ₹ 2000
22. ₹ 500 is divided among A, B, C in such a way that ₹ 16 more $\frac{2}{5}$ of A's share, ₹ 70 less than $\frac{3}{4}$ of B's share, and ₹ 4 less than $\frac{3}{5}$ of C's share are equal. Find B's share.
(a) ₹ 300 (b) ₹ 400
(c) ₹ 100 (d) ₹ 200
23. The ratio of amount distributed in all the male & female as salary is 6 : 5 while the ratio of salary of each male & each female is 2 : 3. Find the ratio of no. of male & female.
(a) 9 : 5 (b) 7 : 5
(c) 11 : 3 (d) 7 : 6
24. ₹ 430 is divided among 45 persons such that the ratio of total amount received by all men, all women & all children are in the ratio 12 : 15 : 16. While the ratio of amount received by each men, each woman & each child is 6 : 5 : 4. Find the amount received by each man.
- (a) ₹ 10 (b) ₹ 15
(c) ₹ 18 (d) ₹ 12
25. The ratio of last year income of A, B & C is 3 : 4 : 5. While the ratio of the last year income to current year income of A, B, C 4 : 5, 2 : 3 and 3 : 4. If their total current year income is ₹ 98,500. Find the present income of B+C.
(a) ₹ 60000 (b) ₹ 76000
(c) ₹ 80000 (d) ₹ 85000
26. Ratio of income of A, B, C is 3 : 7 : 4 and the ratio of their expenditure is 4 : 3 : 5. If A saves $14\frac{2}{7}\%$ of his income. Find the ratio of their saving.
(a) 7 : 65 : 31 (b) 6 : 71 : 11
(c) 6 : 73 : 11 (d) 7 : 65 : 13
27. A dog takes 7 jumps for every 10 jumps of the lion and a fox takes 12 jumps for every 10 jumps of the lion. And the distance covered by dog in 5 jumps, distance covered by lion in 15 jumps and the distance covered by fox in 20 jumps is equal. Find the ratio of their speeds.
(a) 23 : 21 : 19 (b) 21 : 10 : 9
(c) 19 : 17 : 23 (d) 17 : 19 : 21
28. ₹ 710 is divided among A, B and C in such a way that A receives ₹ 40 more than B, C receives ₹ 30 more than A. Find the Share of C.
(a) ₹ 270 (b) ₹ 200
(c) ₹ 240 (d) ₹ 300
29. The age of father is 3 times of his son. 5 years before the age of son was $\frac{1}{6}$ times of his father. Find the present age of son. At the time of marriage of his mother, she was 5 years younger to his father. Find the age of mother.
(a) 18 (b) 25
(c) 28 (d) 20
30. The ratio of age of Meena to her mother is 3 : 8. Find the ratio of their age after 4 years, if after 10 years their age difference will be 35 years.
- (a) 7 : 11 (b) 9 : 13
(c) 5 : 12 (d) 6 : 11
31. 3 Vessels whose capacities are 3 : 2 : 1 are completely filled with milk. Mixed water in the mixture of Vessels are 5 : 2, 4 : 1 and 4 : 1 respectively. Taking $\frac{1}{3}$ of first, $\frac{1}{2}$ of 2nd and $\frac{1}{7}$ of 3rd mixtures, kept in a new vessel is prepared. The % of water in new mixture is?
(a) 25% (b) 24%
(c) 20% (d) 30%
32. The number of employees are reduced in the ratio 3 : 2 and the salary of each employee is increased in the ratio 4 : 5. By doing so, company saves Rs. 12,000. So, find the initial expenditure on salary.
(a) ₹ 60000 (b) ₹ 70000
(c) ₹ 72000 (d) ₹ 80000
33. The ratio of income of A and B is 3 : 2 and the ratio of their expenditure is 4 : 3 and their savings are respectively ₹ 2,000 and Rs. 1000. Find the income of A and B respectively.
(a) ₹ 6000, 4000
(b) ₹ 3000, 2000
(c) ₹ 4500, 3000
(d) ₹ 7500, 5000
34. A, B, C along completed a piece of work in 30, 50 and 40 days. The ratio of the salary of each day is 4 : 3 : 2 respectively. If the total income of A is Rs. 144, find total income of B.
(a) ₹ 150 (b) ₹ 120
(c) ₹ 180 (d) ₹ 200
35. A person cover certain distance by train, bus and car in ratio 4 : 3 : 2. The ratio of fair is 1 : 2 : 4 per km. The total expenditure as a fair is Rs. 720. Then, total expenditure as fair on train.
(a) ₹ 150 (b) ₹ 160
(c) ₹ 175 (d) ₹ 200
36. Rs. 7800 are distributed among A, B and C. The share of A is $\frac{3}{4}$



- share of B and share of B is $\frac{2}{3}$
of the share of C. Then find the difference between share of B and C.
- (a) ₹ 1200 (b) ₹ 1500
(c) ₹ 1800 (d) ₹ 2000
37. A bag contains Rs. 410 in the form of Rs. 5, Rs. 2 and Rs. 1 coins. The number of coins are in ratio of 4 : 6 : 9. So, find the number of 2 Rs. coins.
(a) 50 (b) 70
(c) 60 (d) 80
38. The salaries of A, B and C are in the ratio 1 : 3 : 4. If the salaries are increased by 5%, 10% and 15% respectively, then the increased salaries will be in the ratio.
(a) 21 : 66 : 92 (b) 7 : 13 : 17
(c) 21 : 69 : 83 (d) 7 : 17 : 23
39. Rs. 68,000 is divided among A, B and C in the ratio of $\frac{1}{2} : \frac{1}{4} : \frac{5}{16}$. The difference of the greatest and the smallest parts is
(a) ₹ 12000 (b) ₹ 15000
(c) ₹ 18000 (d) ₹ 16000
40. A sum of ₹ 3115 is divided among A, B and C such that if ₹ 25, ₹ 28 and ₹ 52 be diminished from their shares respectively, the remainder shall be in the ratio of 8 : 15 : 20. Find the share of C.
(a) ₹ 1200 (b) ₹ 585
(c) ₹ 1452 (d) ₹ 1078
41. Gold is 19 times as heavy as water and copper is 9 times as heavy as water. The ratio in which these two metals be mixed so that the mixture is 15 times as heavy as water, is:
(a) 4 : 3 (b) 3 : 1
(c) 3 : 2 (d) 11 : 9
42. There are two vessels of equal capacity, one full of milk, and the second one-third full of water. The second vessel is then filled up put of the first, the contents of the second are then poured back into the first till it is full and then again the contents of the first are poured back into the second till it is full. What is the proportion of milk in the second vessel?
(a) 20 : 7 (b) 7 : 2
(c) 9 : 7 (d) 7 : 5
43. The ratio of two number's difference, sums, and multiple of number 1 : 7 : 24 respectively. Find the multiple of their number.
(a) 51 (b) 48
(c) 64 (d) 80
44. 3 vessels are filled with water. $\frac{1}{3}$ rd from first is poured into second, then $\frac{1}{4}$ th from second is poured into third. Finally, $\frac{1}{10}$ th from third is poured into first. At last, each vessel contains 9 litres of water. Find quantity of water in each vessel at start.
(a) 12, 8, 7 (b) 12, 10, 9
(c) 15, 10, 8 (d) 12, 7, 8
45. ₹ 180 contained in a box consists of one rupee, 50 paise and 25 paise coins in the ratio 2 : 3 : 4. What is the number of 50 paise coins?
(a) 60 (b) 120
(c) 150 (d) 180
46. If $a : b = \frac{2}{9} : \frac{1}{3}$, $b : c = \frac{2}{7} : \frac{5}{14}$ and $d : c = \frac{7}{10} : \frac{3}{5}$ then $a : b : c : d$ is
(a) 4 : 6 : 7 : 9
(b) 16 : 24 : 30 : 35
(c) 8 : 12 : 15 : 7
(d) 30 : 35 : 24 : 16
47. If $a : b : c = 2 : 3 : 4$ and $2a - 3b + 4c = 33$, then the value of c is
(a) 6 (b) 9
(c) 12 (d) $\frac{66}{7}$
48. ₹ 33,630 are divided among A, B and C in such a manner that the ratio of the amount of A to that of B is 3 : 7 and the ratio of the amount of B to that of C is 6 : 5. The amount of money received by B is
(a) ₹ 14,868 (b) ₹ 16,257
(c) ₹ 13,290 (d) ₹ 12,390
49. The total marks obtained by Arun in English and Mathematics are 170. If the difference between his marks in these two subjects is 10. Then the ratio of his marks in these subjects is
(a) 7 : 8 (b) 8 : 7
(c) 9 : 8 (d) 9 : 7
50. The weight of Mr. Gupta and Mrs. Gupta are in the ratio 7 : 8 and their total weight is 120 kg. After taking a dieting course Mr. Gupta reduces by 6 kg and the ratio between their weights changes to 5 : 6. So Mrs. Gupta has reduced by
(a) 2 kg (b) 4 kg
(c) 3 kg (d) 5 kg
51. If $A : B = 4 : 9$ and $A : C = 2 : 3$ then $(A + B) : (B + C)$ is
(a) 15 : 13 (b) 10 : 13
(c) 13 : 10 (d) 13 : 15
52. If the sum of two quantities is equal to three times their difference, then the ratio of the two quantities is
(a) 1 : 3 (b) 3 : 1
(c) 2 : 1 (d) 2 : 3
53. The ratio of the volume of water and glycerine in 240cc of mixture is 1 : 3. The quantity of water (in cc) that should be added to the mixture so that the new ratio of the volumes of water and glycerine becomes 2 : 3 is
(a) 55 cc (b) 60 cc
(c) 62.5 cc (d) 64 cc
54. The ratio of the income of A and B as well as of B and C is 3 : 2. If one third of A's income exceeds one fourth of C's income by ₹ 1000, what is B's income in ₹?
(a) 3000 (b) 2500
(c) 3500 (d) 4000



55. If $(a+b) : (b+c) : (c+a) = 6 : 7 : 8$ and $(a+b+c) = 14$, then the value of c is
 (a) 6 (b) 7
 (c) 8 (d) 14
56. If 5.5 of $a = 0.65$ of b , then $a : b$ is equal to :
 (a) 13 : 11 (b) 11 : 13
 (c) 13 : 110 (d) 110 : 13
57. The ratio of number of balls in bags x, y is 2 : 3. Five balls are taken from bag y and are dropped in bag x , number of balls are equal in each bag now. Number of balls in each bag now is
 (a) 45 (b) 20
 (c) 30 (d) 25
58. A box contains 420 coins of 1 rupee, 50 paise and 20 paise coins. The ratio of their values is 13 : 11 : 7. The number of 50 paise coins is
 (a) 42 (b) 78
 (c) 66 (d) 132
59. A box contains ₹ 56 in the form of coins of one rupee, 50 paise and 25 paise. The number of 50 paise coins is double the number of 25 paise coins and four times the number of one rupee coins. How many 50 paise coins are there in the box?
 (a) 52 (b) 64
 (c) 32 (d) 16
60. A certain amount of money is divided among x, y and z . If x receives 25% more than y and y receives 25% less than z , then $x : y : z$ is equal to
 (a) 14 : 12 : 13 (b) 15 : 12 : 16
 (c) 10 : 9 : 12 (d) 12 : 10 : 11
61. A sum of ₹ 300 is divided among P, Q and R in such a way that Q gets ₹ 30 more than P and R gets ₹ 60 more than Q . The ratio of their share is
 (a) 5 : 3 : 2 (b) 2 : 3 : 5
 (c) 3 : 2 : 5 (d) 2 : 5 : 3
62. Which of the following represents a correct proportion?
 (a) 12 : 9 :: 16 : 12
 (b) 13 : 11 :: 5 : 4
 (c) 30 : 45 :: 13 : 24
 (d) 3 : 5 :: 2 : 5
63. A man divides his property so that his son's share to his wife's and wife's share to his daughter's are both as in the ratio 3 : 1. If the daughter gets ₹ 10,000 less than son, the value (in rupees) of the whole property is
 (a) ₹ 16,250 (b) ₹ 16,000
 (c) ₹ 18,250 (d) ₹ 17,000
64. A policeman starts to chase a thief. When the thief goes 10 steps the policeman moves 8 steps and 5 steps of the policeman are equal to 7 steps of the thief. The ratio of the speeds of the policeman and the thief is:
 (a) 25 : 28 (b) 25 : 26
 (c) 28 : 25 (d) 56 : 25
65. In 2 kg mixture of copper and aluminium, 30% is copper. How much aluminium powder should be added to the mixture so that the quantity of copper becomes 20%?
 (a) 900 gms (b) 800 gms
 (c) 1000 gms (d) 1200 gms
66. If $p : q = r : s = t : u = 2 : 3$, then $(mp + nr + ot) : (mq + ns + ou)$ is equal to:
 (a) 1 : 3 (b) 1 : 2
 (c) 2 : 3 (d) 3 : 2
67. If $a : b = b : c$, then $a^4 : b^4$ is equal to
 (a) $ac : b^2$ (b) $a^2 : c^2$
 (c) $c^2 : a^2$ (d) $b^2 : ac$
68. If $p : q : r = 1 : 2 : 4$, then $\sqrt{5p^2 + q^2 + r^2}$ is equal to
 (a) 5 (b) 2q
 (c) 5p (d) 4r
69. If $a : b = c : d$, then $\frac{ma+nc}{mb+nd}$ is **not** equal to
 (a) $\frac{a}{b}$ (b) $\frac{c}{d}$
 (c) $\frac{c+d}{b+d}$ (d) $\frac{c-a}{b-d}$
70. If a and b are rational numbers and $a + b\sqrt{3} = \frac{1}{2-\sqrt{3}}$, then $a : b$ is equal to
 (a) -2 : 1 (b) 2 : 1
 (c) $\sqrt{3} : 1$ (d) $-\sqrt{3} : 1$
71. If $\frac{2}{3}$ of $A = 75\%$ of $B = 0.6$ of C , then $A : B : C$ is
 (a) 2 : 3 : 3 (b) 3 : 4 : 5
 (c) 4 : 5 : 6 (d) 9 : 8 : 10
72. The ratio $4^{3.5} : 2^5$ is same as
 (a) 4 : 1 (b) 2 : 1
 (c) 1 : 2 (d) 1 : 4
73. On mixing two classes A and B of students having average marks 25 and 40 respectively, the overall average marks obtained is 30. Find the ratio of the students in the class A and B .
 (a) 2 : 1 (b) 5 : 8
 (c) 5 : 6 (d) 3 : 4
74. In a school, the ratio of number of boys to girls is 4 : 3 and the ratio of number of girls to teachers is 8 : 1. Then the ratio of students to teachers is:
 (a) 56 : 3 (b) 55 : 1
 (c) 49 : 3 (d) 56 : 1
75. Find two mean proportions between 2 and 54.
 (a) 6 and 18 (b) 6 and 12
 (c) 12 and 18 (d) 6 and 9
76. If $(a+b) : \sqrt{ab} = 4 : 1$, where $a > b > 0$, then $a : b$ is
 (a) $(2 + \sqrt{3}) : (2 - \sqrt{3})$
 (b) $(2 - \sqrt{3}) : (2 + \sqrt{3})$
 (c) $(3 + \sqrt{2}) : (3 - \sqrt{2})$
 (d) $(3 - \sqrt{2}) : (3 + \sqrt{2})$
77. If $(x^3 - y^3) : (x^2 + xy + y^2) = 5 : 1$ and $(x^2 - y^2) : (x - y) = 7 : 1$, then the ratio $2x : 3y$ equals
 (a) 4 : 1 (b) 2 : 3
 (c) 4 : 3 (d) 3 : 2
78. To get the ratio $p : q$ (for $p \neq q$), a number has to add in each term of the ratio $x : y$, the number is



- (a) $\frac{px + xy}{p - q}$ (b) $\frac{qx + py}{p - q}$
- (c) $\frac{px + qy}{p - q}$ (d) $\frac{qx - py}{p - q}$
79. There is ratio of 5 : 4 between two numbers. If 40 per cent of the first is 12, then 50% of the second number is
(a) 12 (b) 24
(c) 18 (d) 20
80. A milkman makes 20% profit by selling milk mixed with water at ₹ 9 per litre. If the cost price of 1 litre of milk is ₹ 10, then the ratio of milk and water in the mixture is
(a) 3 : 1 (b) 4 : 1
(c) 3 : 2 (d) 4 : 3
81. A man ordered 4 pairs of black socks and some pairs of brown socks. The price of a black socks pairs is double that of a brown pair. While preparing the bill the clerk interchanged the number of black and brown pairs by mistake which increased the bill by 50%. The ratio of the number of black and brown pairs of socks in the original order was :
(a) 2 : 1 (b) 1 : 4
(c) 1 : 2 (d) 4 : 1
82. Harsha is 40 years old and Ritu is 60 years old. How many years ago was the ratio of their ages 3 : 5 ?
(a) 10 years (b) 20 years
(c) 37 years (d) 5 years
83. Four years ago, the ratio of the ages of A and B was 2 : 3 and after four years it will become 5 : 7. Find their present age.
(a) 36 years and 40 years
(b) 32 years and 40 years
(c) 40 years and 56 years
(d) 36 years and 52 years
84. My grandfather was 9 times older than me 16 years ago. he will be 3 times of my age after 8 years from now. Eight years ago, the ratio of my age to that of my grandfather was
(a) 3 : 8 (b) 2 : 5
(c) 1 : 2 (d) 1 : 5
85. The ratio of the ages of A and B at present is 3 : 1. Four years earlier the ratio was 4 : 1. The present age of A is
(a) 48 years (b) 40 years
(c) 36 years (d) 32 years
86. Eighteen years ago, the ratio of A's age to B's age was 8 : 13. Their present age ratio is 5 : 7. What is the present age of A?
(a) 60 years (b) 70 years
(c) 50 years (d) 40 years
87. The current ages of Sonali and Monali are in the ratio 5 : 3. After five years from now, their ages will be in the ratio 10 : 7. Then, Monali's current age is
(a) 5 years (b) 3 years
(c) 9 years (d) 15 years
88. The sum of three numbers is 68. If the ratio of the first to the second be 2 : 3 and that of the second to the third be 5 : 3, then the second number is
(a) 30 (b) 58
(c) 20 (d) 48
89. Which number when added to each of the numbers 6, 7, 15, 17 will make the resulting numbers proportional?
(a) 6 (b) 5
(c) 4 (d) 3
90. What number should be added to each of 6, 14 18 and 38 so that the resulting numbers make a proportion?
(a) 1 (b) 2
(c) 3 (d) 4
91. If the square of the sum of two numbers is equal to 4 times of their product, then the ratio of these numbers is:
(a) 2 : 1 (b) 1 : 3
(c) 1 : 1 (d) 1 : 2
92. Three numbers are in the ratio 2 : 3 : 4. If the sum of their squares is 1856, then the numbers are
(a) 8, 12 and 16
(b) 16, 24 and 32
(c) 12, 18 and 24
(d) None of these
93. Two numbers are in the ratio of 2 : 3. If their sum is 125, find the numbers
(a) 50, 75 (b) 24, 36
(c) 20, 30 (d) 32, 78
94. The ratio of three positive numbers is 2 : 3 : 5 and the sum of their squares is 608. The three numbers are
(a) 2, 3, 5 (b) 10, 15, 25
(c) 8, 12, 20 (d) 4, 6, 10
95. If two numbers are in the ratio 2 : 3 and the ratio becomes 3 : 4 when 8 is added to both the numbers, then the sum of the two numbers is
(a) 10 (b) 80
(c) 40 (d) 100
96. Two numbers are in the ratio 3 : 4 and their LCM is 180. The first number is
(a) 15 (b) 60
(c) 36 (d) 45
97. The ratio of two numbers is 3 : 4 and their LCM is 120. The sum of numbers is
(a) 105 (b) 140
(c) 70 (d) 35
98. The ratio of two numbers is 3 : 4 and their HCF is 15. Then the sum of the two numbers is:
(a) 105 (b) 115
(c) 120 (d) 110
99. Two numbers are in the ratio $1\frac{1}{2}$: $2\frac{2}{3}$. The ratio become 2:3 when 15 is add to both the numbers The greater of the numbers is :
(a) 27 (b) 36
(c) 48 (d) 64
100. Two numbers are in the ratio 3 : 5. If 9 is subtracted from each then they are in the ratio 12 : 23. Find the smaller number.



- (a) 27 (b) 33
(c) 49 (d) 55
101. The ratio of number of boys to that of girls in a group becomes 2 : 1 when 15 girls leave. But afterwards, when 45 boys also leave, the ratio becomes 1 : 5. Originally the number of girls in the group was
(a) 20 (b) 30
(c) 40 (d) 50
102. The total number of students in a school was 660. The ratio between boys and girls was 13 : 9. After some days, 30 girls joined the school and some boys left the school and new ratio of boys and girls became 6 : 5. The number of boys who left the school is :
(a) 50 (b) 40
(c) 30 (d) 60
103. What number should be subtracted from both the terms of the ratio 11 : 15 so as to make it as 2 : 3?
(a) 2 (b) 3
(c) 4 (d) 5
104. The average of 11 numbers is 36 whereas average of 9 of them is 34. If the remaining two numbers are in the ratio of 2 : 3, find the value of the smaller numbers between remaining two numbers.
(a) 45 (b) 48
(c) 54 (d) 36
105. A container contains two liquids A and B in the ratio 7 : 5. When 9 litres of mixture are drawn off and the container is filled with B, the ratio of A and B becomes 1 : 1. How many litres of liquid A was in the container initially?
(a) 26 (b) $16\frac{1}{2}$
(c) $36\frac{3}{4}$ (d) $26\frac{3}{4}$
106. A container contains 60 kg of milk. From this container 6 kg of milk was taken out and replaced by water. This process was repeated further two times. The amount of milk left in the container is
(a) 34.24 kg (b) 39.64 kg
(c) 43.74 kg (d) 47.6 kg
107. The proportions of acid and water in three samples is 2 : 1, 3 : 2 and 5 : 3. A mixture containing equal quantities of all three samples is made. The ratio of water and acid in the mixture is:
(a) 120 : 133 (b) 227 : 133
(c) 227 : 120 (d) 133 : 227
108. Two alloys are made up of copper and tin. The ratio of copper and tin in the first alloy is 1 : 3 and in the second alloy is 2 : 5. In what ratio should the two alloys be mixed to obtain a new alloy in which the ratio of tin and copper be 8 : 3?
(a) 3 : 5 (b) 4 : 7
(c) 3 : 8 (d) 5 : 11
109. In two alloys A and B, the ratio of zinc to tin is 5 : 2 and 3 : 4 respectively. Seven kg of the alloy A and 21 kg of the alloy B are mixed together to form a new alloy. What will be the ratio of zinc and tin in the new alloy?
(a) 2 : 1 (b) 1 : 2
(c) 2 : 3 (d) 1 : 1
110. Two vessels A and B contain milk and water mixed in the ratio 8 : 5 and 5 : 2 respectively. The ratio in which these two mixtures be mixed to get a new mixture containing $69\frac{3}{15}\%$ milk is:
(a) 3 : 5 (b) 5 : 2
(c) 5 : 7 (d) 2 : 7
111. A barrel contains a mixture of wine and water in the ratio 3 : 1. What fraction of the mixture must be drawn off and substituted by water so that the ratio of wine and water in the resultant mixture in the barrel becomes 1 : 1?
(a) $\frac{1}{4}$ (b) $\frac{1}{3}$
(c) $\frac{3}{4}$ (d) $\frac{2}{3}$
112. In a 729 litres mixture of milk and water, the ratio of milk to water is 7 : 2. To get a new mixture containing milk and water in the ratio 7 : 3, the amount of water to be added is
(a) 81 litres (b) 71 litres
(c) 56 litres (d) 50 litres
113. A and B are two alloys of gold and copper prepared by mixing metals in the ratio 5 : 3 and 5 : 11 respectively. Equal quantities of these alloys are melted to forms a third alloy C. The ratio of gold and copper in the alloy C is
(a) 25 : 33 (b) 33 : 25
(c) 15 : 17 (d) 17 : 15
114. A mixture contains wine and water in the ratio 3 : 2 and another mixture contains them in the ratio 4 : 5. How many litres of the later must be mixed with 3 litres of the former so that the resulting mixture may contain equal quantities of wine and water?
(a) $5\frac{2}{5}$ litres (b) $5\frac{2}{3}$ litres
(c) $4\frac{1}{2}$ litres (d) $3\frac{3}{4}$ litres
115. The ratio of the quantities of an acid and water in a mixture is 1 : 3. If 5 litres of acid is further added to the mixture, the new ratio becomes 1 : 2. The quantity of new mixture (in litres) is
(a) 32 (b) 40
(c) 42 (d) 45
116. Two types of alloy possess gold and silver in the ratio of 7 : 22 and 21 : 37. In what ratio should these alloys be mixed so as to have a new alloy in which gold and silver would exist in the ratio 25 : 62?
(a) 13 : 8 (b) 8 : 13
(c) 13 : 12 (d) 6 : 9



117. Two containers have acid and water mixed respectively in the ratio 3 : 1 and 5 : 3. To get a new mixture with ratio of acid to water as 2 : 1, the two types have to be mixed in the ratio.
 (a) 1 : 2 (b) 2 : 1
 (c) 2 : 3 (d) 3 : 2
118. The ratio of spirit and water in two mixtures of 20 litres and 36 litres is 3 : 7 and 7 : 5 respectively. Both the mixtures are mixed together. Now the ratio of the spirit and water in the new mixture is
 (a) 25 : 29 (b) 9 : 10
 (c) 27 : 29 (d) 27 : 31
119. A can contains a mixture of two liquids A and B in the ratio 7 : 5. When 9 litres of mixture are drained off and the can is filled with B, the ratio of A and B becomes 7 : 9. How many litres of liquid A was contained in the can initially?
 (a) 10 litres (b) 20 litres
 (c) 21 litres (d) 25 litres
120. The ratio of milk and water in mixtures of four containers are 5 : 3, 2 : 1, 3 : 2 and 7 : 4 respectively. In which container is the quantity of milk, relative to water, minimum?
 (a) First (b) Second
 (c) Third (d) Fourth
121. Two equal glasses filled with alcohol and water in the proportions 2 : 1 and 3 : 2 are emptied into a third glass. The proportion of alcohol and water in the third glass will be
 (a) 13 : 17 (b) 19 : 17
 (c) 13 : 11 (d) 19 : 11
122. 80 litres of a mixture contains milk and water in the ratio of 27 : 5. How much more water is to be added to get a mixture containing milk and water in the ratio of 3 : 1 ?
 (a) 5 litres (b) 10 litres
 (c) 15 litres (d) 20 litres
123. A vessel contains 20 litres of acid. 4 litres of acid is taken out of the vessel and replaced by the same quantity of water. Next 4 litres of the mixture are with drawn, and again the vessel is filled with the same quantity of acid. What is the ratio of acid in the vessel is
 (a) 4 : 5 (b) 4 : 25
 (c) 16 : 25 (d) 1 : 5
124. Three vessels whose capacities are 3 : 2 : 1 are completely filled with milk mixed with water. The ratio of milk and water in the mixture of vessels are 5 : 2, 4 : 1 and 4 : 1 respectively. Taking $\frac{1}{3}$ of first, $\frac{1}{2}$ of second and $\frac{1}{7}$ of third mixture, a new mixture kept in a new vessels is prepared. The percentage of water in the new mixture is
 (a) 28% (b) 32%
 (c) 30% (d) 24%
125. Two blends of a commodity costing ₹ 35 and ₹ 40 per kg. respectively are mixed in the ratio 2 : 3 by weight. If one fifth of the mixture is sold at ₹ 46 per kg and the remaining at the rate of ₹ 55 per kg. the profit percent is
 (a) 50% (b) 30%
 (c) 40% (d) 20%
126. The income of A, B and C are in the ratio 3 : 7 : 4 and their expenses in the ratio 4 : 3 : 5. If A saves ₹ 300 out of an income of ₹ 2,400, the saving of B and C are:
 (a) ₹ 4025 and ₹ 575
 (b) ₹ 1575 and ₹ 2,625
 (c) ₹ 2750 and ₹ 1,525
 (d) ₹ 3725 and ₹ 1,525
127. The income of A, B and C are in the ratio 7 : 9 : 12 and their spendings are in the ratio 8 : 9 : 15. If A saves $\frac{1}{4}$ th of his income, then the savings of A, B and C are in the ratio:
 (a) 56 : 99 : 69 (b) 69 : 56 : 99
 (c) 99 : 56 : 69 (d) 99 : 69 : 56
128. Incomes of x and y are in the ratio 4 : 3, Their expenditures are in the ratio 12 : 7. Both save ₹ 3200 at the end of the month, then the income of x is
 (a) ₹ 8000 (b) ₹ 6000
 (c) ₹ 2000 (d) ₹ 4000
129. ₹ 180 contained in a box consists of one rupee, 50 paise and 25 paise coins in the ratio 2 : 3 : 4. What is the number of 50 paise coins?
 (a) 60 (b) 120
 (c) 150 (d) 180
130. If 378 coins consist of rupees, 50 paise and 25 paise coins, whose values are in the ratio 13 : 11 : 7, the number of 50 paise coins will be
 (a) 132 (b) 128
 (c) 136 (d) 133
131. A bag contains ₹ 90 in coins of denominations of 50 paise, 25 paise and 10 paise. If coins of 50 paise, 25 paise and 10 paise are in the ratio 2 : 3 : 5, then the number of 25 paise coins in the bag is
 (a) 80 (b) 120
 (c) 100 (d) 135
132. In a bag, there are three types of coins 1 rupee, 50 paise and 25-paise in the ratio of 3 : 8 : 20. Their total value is ₹ 372. The total number of coins is
 (a) 1200 (b) 961
 (c) 744 (d) 612
133. A box has 210 coins of denominations one-rupee and fifty paise only. The ratio of their respective values is 13 : 11. The number of one-rupee coins is
 (a) 65 (b) 66
 (c) 77 (d) 78
134. A man has in all ₹ 640 in the denominations of one-rupee, five-rupee and ten-rupee notes. The number of each type of notes are equal. What is the total number of notes he has?
 (a) 150 (b) 120
 (c) 100 (d) 90



135. The salaries of A, B and C are in the ratio 1 : 3 : 4. If the salaries are increased by 5%, 10 and 15% respectively, then the increased salaries will be in the ratio
 (a) 20 : 66 : 95 (b) 21 : 66 : 95
 (c) 21 : 66 : 92 (d) 19 : 66 : 92
136. Divide ₹ 1250 among A, B, C so that A gets $\frac{2}{9}$ of B's share and C gets $\frac{3}{4}$ of A's share.
 (a) ₹ 200, ₹ 800, ₹ 250
 (b) ₹ 200, ₹ 900, ₹ 150
 (c) ₹ 150, ₹ 800, ₹ 300
 (d) ₹ 200, ₹ 900, ₹ 75
137. A sum of ₹ 370 is to be divided among A, B and C such that $\frac{\text{A's Share}}{\text{B's Share}} = \frac{\text{B's Share}}{\text{C's Share}}$
 $= \frac{3}{4}$, A's share (in rupees) is
 (a) 240 (b) 120
 (c) 100 (d) 90
138. ₹ 900 is divided among A, B, C the division is such that $\frac{1}{2}$ of A's money = $\frac{1}{3}$ of B's money = $\frac{1}{4}$ of C's money. Find the amount (in ₹) received by A, B and C.
 (a) 300, 400, 200
 (b) 350, 450, 100
 (c) 200, 300, 400
 (d) 400, 150, 350
139. ₹ 555 was to be divided among A, B and C in the ratio of $\frac{1}{4} : \frac{1}{5} : \frac{1}{6}$. But by mistake it was divided in the ratio of 4 : 5 : 6. The amount in excess received by C was
 (a) ₹ 72 (b) ₹ 75
 (c) ₹ 22 (d) ₹ 52
140. The ratio of the first and the second class train fares between two stations is 3 : 1 and that of the numbers of passengers travelling between the two stations by first and second classes is 1 : 50. If on a particular day, ₹ 1,325 are collected from passengers travelling between the two stations, then the amount collected from the second class passengers is
 (a) ₹ 1,250 (b) ₹ 1,000
 (c) ₹ 850 (d) ₹ 750
141. In an innings of a cricket match, three players A, B and C scored a total of 361 runs. If the ratio of the number of runs scored by A to that scored by B and also number of runs scored by B to that scored by C be 3 : 2, the number of runs scored by A was
 (a) 171 (b) 181
 (c) 185 (d) 161
142. In a cricket match the total number of runs scored by Sachin, Vinod and Sourav is 285. The ratio of the number of runs scored by Sachin and Sourav is 3 : 2 and that of the runs scored by Sourav and Vinod is also 3 : 2. The number of runs scored by Sachin in that match is
 (a) 135 (b) 90
 (c) 60 (d) 140
143. The price of a refrigerator and a television set are in the ratio 5 : 3. If the refrigerator costs ₹ 5500 more than the television set, then the price of the refrigerator is
 (a) ₹ 27500 (b) ₹ 8250
 (c) ₹ 13750 (d) ₹ 16500
144. Three persons walk from place A to place B. Their speeds are in the ratio 4 : 3 : 5. The ratio of the time taken by them to reach B will be
 (a) 10 : 15 : 13 (b) 2 : 3 : 4
 (c) 15 : 20 : 12 (d) 16 : 18 : 15
145. In a school, 10% of number of girls is equal to $\frac{1}{20}$ of number of boys. Ratio between the number of boys to the number of girls is
 (a) 1 : 2 (b) 2 : 1
 (c) 1 : 4 (d) 4 : 1
146. In a library the ratio of story books and other books is 7 : 2 and there are 1512 story books. Due the collection of some more story books the said ratio becomes 15 : 4. The number of story books collected is
 (a) 108 (b) 100
 (c) 205 (d) 97
147. In a 500 metre race, the ratio of speeds of two runners P and Q is 3 : 5. P has a start of 200 metre than the distance between P and Q at the finish of the race is
 (a) P wins by 100 metre
 (b) Both reach at the same time
 (c) Q wins by 100 metre
 (d) Q wins by 50 metre
148. In a school there were 1554 students and the ratio of the number of the boys and the girls was 4 : 3. After a few days, 30 girls joined the school but a few boys left; as a result the ratio of the boys and girls became 7 : 6. The number of boys who left the school is
 (a) 76 (b) 74
 (c) 84 (d) 86
149. The ratio of income in two consecutive years is 2 : 3 respectively. The ratio of their expenditure is 5 : 9. Income of second year is ₹ 45000 and Expenditure of 1st year is ₹ 25000. Savings in both years together is.
 (a) ₹ 6000 (b) ₹ 5000
 (c) ₹ 4500 (d) ₹ 7000

ANSWER KEY

1. (a)	16. (b)	31. (b)	46. (b)	61. (b)	76. (a)	91. (c)	107.(b)	125.(c)	143.(c)
2. (a)	17. (c)	32. (c)	47. (c)	62. (a)	77. (a)	92. (b)	108.(b)	126.(a)	144.(c)
3. (c)	18. (a)	33. (a)	48. (a)	63. (a)	78. (d)	93. (a)	109.(d)	127.(a)	145.(b)
4. (d)	19. (d)	34. (c)	49. (c)	64. (c)	79. (a)	94. (c)	110.(d)	128.(a)	146.(a)
5. (c)	20. (d)	35. (b)	50. (b)	65. (c)	80. (a)	95. (c)	111.(b)	129.(b)	147.(b)
6. (d)	21. (a)	36. (a)	51. (d)	66. (c)	81. (b)	96. (d)	112.(a)	130.(a)	148.(a)
7. (c)	22. (d)	37. (c)	52. (c)	67. (b)	82. (a)	97. (c)	113.(c)	131.(b)	149.(b)
8. (d)	23. (a)	38. (a)	53. (b)	68. (c)	83. (d)	98. (a)	114.(a)	132.(b)	
9. (a)	24. (d)	39. (d)	54. (a)	69. (d)	84. (d)	99. (c)	115.(d)	133.(b)	
10. (c)	25. (b)	40. (c)	55. (a)	70. (b)	85. (c)	100.(b)	116.(a)	134.(b)	
11. (d)	26. (b)	41. (c)	56. (c)	71. (d)	86. (c)	101.(c)	117.(a)	135.(c)	
12. (d)	27. (b)	42. (a)	57. (d)	72. (a)	87. (c)	102.(c)	118.(c)	136.(b)	
13. (d)	28. (a)	43. (b)	58. (d)	73. (a)	88. (a)	103.(b)	119.(c)	137.(d)	
14. (d)	29. (d)	44. (b)	59. (b)	74. (a)	89. (d)	104.(d)	120.(c)	138.(c)	
15. (d)	30. (c)	45. (b)	60. (b)	75. (a)	90. (b)	105.(e)	121.(d)	139.(a)	
						106.(c)	122.(b)	140.(a)	
							123.(c)	141.(a)	
							124.(d)	142.(a)	

Solution

1. (a) We know that fourth Proportional

$$d = \frac{b \times c}{a}$$

Where $b = 8$

$$c = 9$$

$$a = 6$$

then,

$$\frac{8 \times 9}{6} = 12$$

2. (a) According to the question,

$$₹1 : 50P : 25P$$

$$\begin{aligned} \text{Volumes} &\rightarrow \frac{5x}{100} : \frac{7x}{100} : \frac{9x}{100} \\ \text{No. of coins} &\rightarrow 1 \times 5x = 5x : \frac{50 \times 7x}{100} = 3.50x : \frac{25 \times 9x}{100} = 2.25x \end{aligned}$$

Given, Total Rupees = $5x + 3.50x + 2.25x$

$$₹ 10.75x = 430$$

$$x = 40$$

$\therefore$ No. of coins

$$5 \times 40 ; 7 \times 40, 9 \times 40$$

$$200, 280, 360$$

3. (c) $\frac{\text{Milk} : \text{Water}}{11 : 6} : \frac{\text{Milk} : \text{Water}}{8 : 9}$

Milk : Water

$$\frac{11}{17} : \frac{8}{17}$$

$$11 : 8$$

4. (a) According to the question

Milk Water

$$\text{1st vessel } 9 : 5 = 14$$

$$\text{2nd vessel } 4_{x_2} : 3_{x_2} = 7_{x_2} = 14$$

$$\frac{17}{17} : \frac{11}{17}$$

Therefore, Ratio of milk to water in the new Mixture

$$= 17 : 11$$

5. (c) I $(3 : 4) \times_{9 \times 1} = 7 \times 9$
II $(5 : 4) \times_{7 \times 4} = 9 \times 7$

After equating the capacity of the vessels the resulting ratio of water and milk

$$\text{Water : Milk} \\ 27 : 36$$

$$\frac{140}{167} : \frac{112}{148}$$

6. (d) Given Total amount

$$\begin{array}{c} 950 \\ \swarrow \quad \downarrow \quad \searrow \\ A : B : C \\ 5x : 11x : 3x \end{array}$$

$$19x = 950$$

$$x = 50$$

Difference between the share of B and A

$$11x - 5x$$

$$= 6x = 6 \times 50 = ₹ 300$$

Alternate:-

Total 950

$$A : B : C$$

$$5 : 11 : 3$$

$$\text{Total 19 units} = 950$$

$$1 \text{ unit} = 50$$

According to the question,

$$B - A = 6 \text{ units}$$

$$= 6 \times 50 = ₹ 300$$

7. (c) According to the question

$$I + II + III = 275$$

given,

$$I : II : III$$

$$3 : 7 : 7$$

$$\frac{2}{6} : \frac{2}{14} : \frac{5}{35}$$

$$\text{Total 55 units} \Rightarrow 275$$

$$1 \text{ units} = 5$$

$$\text{IInd no. is} \Rightarrow 14 \times 5 = 70$$

8. (b) According to the question,

$$A : B = 3 : 4$$

$$B : C = 5 : 7$$

$$C : D = 3 : 5$$

then,

$$A : B : C : D$$

$$3 : 4 : 4 : 4$$

$$\frac{5}{5} : \frac{5}{5} : \frac{7}{7} : \frac{7}{7}$$

$$\frac{3}{45} : \frac{3}{60} : \frac{3}{84} : \frac{5}{140}$$

9. (a) Hounds Rabbit

$$\text{Jumps } 3 : 4$$

$$\text{Distance } \frac{3}{9} : \frac{2}{8}$$

10. (c) Milk : Water
Old $(2 : 1)$
 $2 \times (1 : 2)$

$$\text{New } 2 : 1 \rightarrow 3 \text{ unit}$$

Initial amount of mixture = $2 + 1 = 3 \text{ units}$

$$3 \text{ units} \rightarrow 60 \text{ litres}$$

$$1 \text{ unit} \rightarrow 20 \text{ litres}$$

Amount of water to be added = $4 - 1 = 3 \text{ units} \rightarrow 60 \text{ litres}$

11. (d) According to the question

Milk : Water

$$\text{Old } 2 \times (4 : 3)$$

$$8 : 7$$

$$\text{New } 8 : 6 \rightarrow 1 \text{ unit} \rightarrow 2 \text{ litres}$$

$$8 : 7$$

$$\text{Final mixture} = 8 + 7 = 15 \text{ units}$$

$$= 15 \times 2 = 30 \text{ litres}$$

12. (d) A : B

$$\text{Old Income } 9_{x_4} : 4_{x_4} = 5 \text{ (diff.)}$$

$$\text{Expenditure } 7_{x_5} : 3_{x_5} = 4$$

on cross multiplication

$$\text{New Income} \rightarrow 36 : 16$$

$$\text{Exp.} \rightarrow 35 : 15$$

$$\text{Saving} = 1 \text{ unit} \rightarrow \text{Rs.2000}$$

$$\text{A's income} = 36 \times 2000$$

$$= ₹ 72000$$

$$\text{B's income} = 16 \times 2000$$

$$= ₹ 32000$$

13. (d) According to the question

Old Milk : Water

$$2 \times (4 : 3)$$

$$8 : 7$$

New

$$8 : 6 \rightarrow 1 \text{ unit} \rightarrow 6 \text{ litres}$$

$$8 : 7$$

$$\text{Final mixture} = 8 + 7 = 15 \text{ units}$$

$$= 15 \times 6 = 90 \text{ litres}$$

14. (d) Let's take ratio = $\frac{1 \rightarrow \text{water}}{3 \rightarrow \text{milk}}$

Milk Initially	Finally milk
$\frac{3}{\frac{3}{9}}$	$\frac{2}{\frac{2}{4}}$

9 units = 81 liters

1 unit = 9 liters

4 units = 36 liters

$\therefore$ milk = 36

and, Water = 81 - 36 = 45

$\therefore$ Milk : Water

36 : 45

4 : 5

Alternate:-

Final milk = Initial milk $\times$

$$\left(1 - \frac{\text{milk taken out}}{\text{initial milk}}\right)^n$$

$$= 81 \left(1 - \frac{27}{81}\right)^2 = 81 \left(1 - \frac{1}{3}\right)^2$$

$$= 81 \times \frac{2}{3} \times \frac{2}{3} = 36 \text{ liters}$$

final water = 81 - 36 = 45 liters

$$\text{Required ratio} = \frac{36}{45} = \frac{4}{5}$$

15. (d) Tom : Jerry
Jumps 8 : 6
Distance in each Jump 5 : 7
Speed $\frac{40}{20} : \frac{42}{21}$

16. (b) M : W
- | | |
|-----------------------------------|-----------------------------------|
| $\frac{2 \times 20}{3 \times 15}$ | $\frac{1 \times 20}{1 \times 15}$ |
| $\frac{3 \times 12}{40+45+36}$ | $\frac{2 \times 12}{20+15+24}$ |

121 : 59

17. (c) M : W
- | | |
|----------------------------------|----------------------------------|
| $\frac{4 \times 10}{5 \times 6}$ | $\frac{5 \times 10}{1 \times 6}$ |
| $\frac{40+30}{70}$ | $\frac{50+6}{56}$ |

35 : 28
5 : 4

18. (a)

Zinc : Copper

$$\frac{1 \times 8}{8+9} : \frac{2 \times 8}{16+27} \rightarrow \frac{8}{17} : \frac{16}{43}$$

17 : 43

19. (d)



Earth : NH

2 : 1

Land : Water

$$\begin{array}{l} \text{Earth } 1 \times 10 : 2 \times 10 \rightarrow 3 \times 5 \times 2 \rightarrow 30 \\ \text{N.H. } 2 \times 3 : 3 \times 3 \rightarrow 5 \times 3 \times 1 \rightarrow 15 \\ \text{S.H. } \frac{10-6}{20-9} \end{array}$$

4 : 11

20. (d) A : B : C : D

$$\begin{array}{cccc} 1 & 2 & 2 & 2 \\ 3 & 3 & 1 & 1 \\ 2 & 2 & 2 & 3 \\ \hline 6 & 12 & 4 & 6 \\ 3 & 6 & 2 & 3 \end{array}$$

$$\therefore (A+B) = \frac{9}{14} \times 5600$$

= Rs. 3600 Ans.

21. (a) A : B : C
- Saving. 5 : 6 : 9
- Income 25 : 40 : 36 $\rightarrow$ 101
- $\therefore$ Income A = $\frac{6060}{101} \times 25$
- = Rs. 1500

22. (d) $\frac{2A}{5} + 16 = \frac{3B}{4} - 70 = \frac{3C}{5} - 4$
- = 6k (say)
- (LCM of 2, 3, 3)
- $\therefore A = 15k - 40$

$$B = 8k + \frac{280}{3}$$

$$C = 10k + \frac{20}{3}$$

$$\text{Sum} = (15k + 8k + 10k)$$

$$+ (-40 + \frac{280}{3} + \frac{20}{3}) = 500$$

$$k = \frac{40}{3}$$

$$\therefore B = 8k + \frac{280}{3}$$

$$= 8 \times \frac{40}{3} + \frac{280}{3} = \text{Rs. } 200$$

23. (a) M : F
- all 6 : 5
- each 2 : 3
- $\therefore$ Ratio 3 : $\frac{5}{3}$
- 9 : 5

24. (d)

M : W : C

$$\begin{array}{l} \text{total } 12 \quad 15 \quad 16 \rightarrow 43 \text{ units} \rightarrow \text{Rs. } 430 \\ \text{each } 6 \quad 5 \quad 4 \quad \therefore 1 \text{ unit} \rightarrow \text{Rs. } 10 \\ \text{ratio } \frac{2}{10} : \frac{3}{15} : \frac{4}{20} \rightarrow 9 \text{ units} = 45 \\ \quad \quad \quad \times 5 \quad \times 5 \quad \times 5 \quad \therefore 1 \text{ unit} = 5 \end{array}$$

10 men : 15 women : 20 children

$\therefore$ Money $\Rightarrow$ all men

$$= 12 \times 10 = \text{Rs. } 120$$

$$\text{each man} = \text{Rs. } \frac{120}{10} = \text{Rs. } 12$$

$$\text{each woman} = \text{Rs. } \frac{150}{15} = \text{Rs. } 10$$

25. (b) A B C
- Last 3 4 5
- L:C 4:5 2:3 3:4 LCM = 12
- (2, 3, 4)

$$\begin{array}{ccc} \therefore & 3 \times 12 & 4 \times 12 & 5 \times 12 \\ & 36 & 48 & 60 \\ & \swarrow 4:5 & \swarrow 2:3 & \swarrow 3:4 \\ & 9 & 24 & 20 \\ & \downarrow & \downarrow & \downarrow \\ & 45 & 72 & 80 \rightarrow 197 \end{array}$$

$$197 \text{ Units} = 98500$$

$$\therefore (B+C) = \frac{152}{197} \times 98,500$$

$$= \text{Rs. } 76,000$$

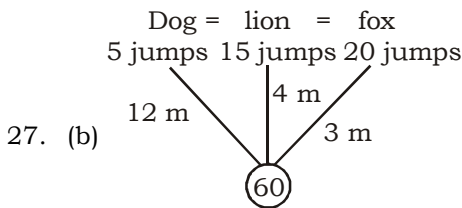
26. (b) A B C
 I 3k 7k 4k $\rightarrow 14$
 E 4y 3y 5y
 $\therefore$ saving $\Rightarrow 3k-4y : 7k-3y : 4k-5y$
 $14 \frac{2}{7}\% = \frac{1(\text{saving})}{7(\text{income})}$

A spend $\frac{1}{7}$ th of his income

$$\therefore \frac{3k}{4y} = \frac{7}{6} \Rightarrow \frac{k}{y} = \frac{14}{9}$$

$$= (42-36) : (98-27) : (56-45)$$

$$= \mathbf{6 : 71 : 11}$$



Dog	lion	fox
7	10	12
$\times 12$	$\times 4$	$\times 3$
84	40	36

$\therefore 21 : 10 : 9$

28. (a) money be $\Rightarrow B, A = B+40, C = A+30 = B+70$

$$\therefore 3B+110 = 710 \Rightarrow B = 200$$

$$\therefore C = \text{Rs. } 270 \text{ ans}$$

29. (d) Age of son be x and father's age be $3x$

$$5 \text{ years ago, } (3x-5) = 6(x-5)$$

$$3x-5 = 6x-30$$

$$\text{age of son} = \frac{25}{3}$$

$$\text{Father's age} = 25 \text{ years}$$

$$\text{mother age} = 20 \text{ years}$$

30. (c) Meena : Mother
 3 : 8

$$\text{diff} = (8-3) = 5 \text{ units} = 35$$

$$\therefore 1 \text{ unit} = 7$$

$$\therefore \begin{array}{cc} 21 & : & 56 \\ \downarrow +4 & & \downarrow +4 \\ 25 & : & 60 \end{array} = \boxed{5:12}$$

31. (b)

M	:	W	
$V_1 5 \times 5$	:	$2 \times 5 \rightarrow 7$	$3 \times \frac{1}{3}$
$V_2 4 \times 7$	:	$1 \times 7 \rightarrow 5$	$2 \times \frac{1}{2}$
$V_3 4$	:	$1 \rightarrow 5$	$7 \times 1 \times \frac{1}{7}$

$$\therefore 25+28+4 : 10+7+1$$

$$57 : 18 \Rightarrow 19 : 6$$

$$\therefore \% \text{ water} = \frac{6}{25} \times 100 = 24\%$$

32. (c) no. of employees 3 : 2
 salary. $\frac{4 : 5}{12 : 10}$
 $\frac{2}{2}$

$$2 \text{ units} = 12000$$

$$\therefore \text{initial expenditure} = \frac{12}{2} \times 120,00$$

$$\Rightarrow \text{Rs. } \mathbf{72,000}$$

33. (a) A : B
 $I \rightarrow 3x$ $2x$
 $E \rightarrow 4y$ $3y$
 $\therefore 3x-4y = 2000$ and $2x-3y = 1000$
 $9x-12y = 6000$ and $8x-12y = 4000$

$$\therefore x = 2000,$$

$$\therefore I_A = \text{Rs. } 6000, I_B = \text{Rs. } 4000$$

34. (c) A : B : C
 day 30 50 40
 salary 4 3 2

120	150	80
12	15	8

$$12 \text{ units} = 144$$

$$\therefore \text{Income of B} = \frac{144}{12} \times 15 = \text{Rs. } 180$$

35. (b) T : B : C
 Distance 4 3 2
 Fair 1 2 4

4	:	6	:	8
---	---	---	---	---

or

2	:	3	:	4
---	---	---	---	---

$$9 \text{ units} = 720$$

$\therefore$ Total expenditure as Fair on

$$\text{train} = \frac{2}{9} \times 720 = \text{Rs. } \mathbf{160}$$

36. (a) A B C
 3 4 4
 2 2 3

6	8	12
---	---	----

Or

$$3 : 4 : 6$$

$$\therefore (B-C) \text{ share} = \frac{2}{13} \times 7800$$

$$= \text{Rs. } \mathbf{1200}$$

37. (c) Rs.5 : Rs.2 : Rs. 1
 coins 4 6 9
 Value 20 : 12 : 9 = 41

$$\therefore \text{Value of Rs. } 2 = \frac{12}{41} \times 410$$

$$= \text{Rs. } 120$$

$$\therefore \text{No. of 2 Rs. coins} = \frac{120}{2} = \mathbf{60}$$

38. (a) A : B : C
 1 : 3 : 4
 100 300 400
 After 105 330 460
 income =

$$21 : 66 : 92$$

39. (d) A : B : C
 $\frac{1}{2} \times 16$ $\frac{1}{4} \times 16$ $\frac{5}{16} \times 16$
 8 : 4 : 5 = 17

$$\text{Difference} = \frac{8-4}{17} \times 68,000$$

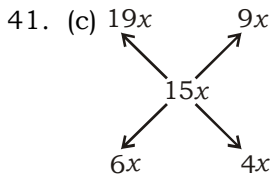
$$= \frac{4}{17} \times 68,000 = \text{Rs. } \mathbf{16000}$$

40. (c) diminished = 25 + 28 + 52
 = Rs. 105
 $\therefore$ Left = Rs. 3115 - 105
 = Rs. 3010

$$\therefore \text{Share of C} = \frac{20}{43} \times 3010$$

$$= \text{Rs. } 1400$$

$$\text{total share} = \text{Rs. } 1452$$



$$= 3 : 2$$

42. (a) Milk : Water
3 : 1

1st Pour 1m

$$2m + 1w (2 : 1)$$

$$\text{2nd Pour } 1m + \frac{4}{3}m + \frac{2}{3}w$$

$$\frac{2}{3}m + \frac{1}{3}w$$

$$\frac{7}{3}m + \frac{2}{3}w (7 : 2)$$

$$\frac{2}{3}m + \frac{1}{3}w$$

$$\text{3rd Pour } \left(\frac{7}{3}m - \frac{7}{9} \times 2m\right) + \left(\frac{2}{3} - \frac{2}{9} \times 2\right)w$$

$$\left(\frac{2}{3} + \frac{7 \times 2}{9}\right)m + \left(\frac{1}{3} + \frac{2 \times 2}{9}\right)w$$

$$\Rightarrow \frac{7}{9}m + \frac{2}{9}w$$

$$\left(\frac{2}{3} + \frac{14}{9}\right)m + \left(\frac{1}{3} + \frac{4}{9}\right)w$$

$$= 7 : 2 \text{ 1st}$$

$$\frac{20}{9}m + \frac{7}{9}w$$

$$= 20 : 7$$

43. (b) $\frac{x+y}{x-y} = \frac{7}{1} \Rightarrow \frac{x}{y} = \frac{4}{3} (4 \times 3 = 12)$

$$\therefore x = 8, y = 6$$

$$\therefore \text{Multiple} = 48$$

44. (b) Solve objectively, easier

$$\begin{array}{ccc} A & B & C \\ 12 & 8 & 7 \end{array}$$

$$\left(\frac{1}{3}A\right) \quad 12-4 = 8 \quad 8+4=12$$

$$\begin{array}{ccc} 8 & 12 & 7 \end{array}$$

$$\left(\frac{1}{4}B\right) \quad 8 \quad 12-37+3$$

$$\begin{array}{ccc} 8 & 9 & 10 \end{array}$$

$$\left(\frac{1}{10}C\right) \quad 8+1 \quad 9 \quad 10-1$$

$$\begin{array}{ccc} 9 & 9 & 9 \end{array}$$

Hence, Required quantity of Water in each vessel = 12, 8 and 7.

45. (b) $1 \text{ ₹} : 50 \text{ p} : 25 \text{ p}$
 $2 : 3 : 4$

$$\Rightarrow 2x : 3x : 4x - \text{coins}$$

$$1 \times 2x : \frac{3x}{2} : \frac{4x}{4} - \text{rupees}$$

$$\Rightarrow \frac{4x + 3x + 2x}{2} = 180$$

$$\Rightarrow \frac{9x}{2} = 180$$

$$x = 40$$

$$\therefore \text{number of coins of } 50 = 3 \times 40 = 120$$

46. (b) $a : b = \frac{2}{9} : \frac{1}{3} = 2 : 3$

$$\Rightarrow b : c = \frac{2}{7} : \frac{5}{14} = 4 : 5$$

$$\Rightarrow d : c = \frac{7}{10} : \frac{3}{5} = 7 : 6$$

$$\Rightarrow \begin{array}{cccc} A & : & B & : & C & : & D \\ x & : & y & : & p & : & q \\ & & & & m & : & n \\ \hline xpm & : & ypm & : & yqm & : & yqn \end{array}$$

$$\text{Required ratio} = 2 \times 4 \times 6 : 6 \times 4 \times 3 : 6 \times 5 \times 3 : 7 \times 5 \times 3$$

$$16 : 24 : 30 : 35$$

47. (c) $a : b : c$
 $2 : 3 : 4$

$$\text{Let } 2x : 3x : 4x$$

$$2a - 3b + 4c = 33$$

$$2 \times 2x - 3 \times 3x + 4 \times 4x = 33$$

$$4x - 9x + 16x = 33$$

$$11x = 33$$

$$x = 3$$

$$\therefore C \Rightarrow 4 \times 3 = 12$$

48. (a) $A : B : C$
 $3 : 7$
 $6 : 5$

$$18 : 42 : 35$$

$$18x + 42x + 35x$$

$$\Rightarrow 95x$$

$$95x = 33630$$

$$x = 354$$

$$\therefore \text{money received by B} = 42x$$

$$= 42 \times 354 = ₹ 14868$$

Note: To save time check unit digit for example $42 \times 354 =$ unit digit is $2 \times 4 = 8$
Check option with unit digit 8. There is only one

Option 14868

49. (c) Marks in

$$\Rightarrow \text{Math} + \text{English} = 170$$

$$\Rightarrow \frac{\text{Math} - \text{English} = 10}{\text{Math} \Rightarrow \frac{180}{2} = 90}$$

$$\therefore \text{English} = 80$$

$$\begin{array}{ccc} \text{Math} & : & \text{English} \\ 90 & : & 80 \\ 9 & : & 8 \end{array}$$

50. (b) Mr. : Mrs.

$$\text{Before } 7x : 8x$$

$$\text{After } 5y : 6y$$

$$\Rightarrow \text{before } 7x + 8x = 120$$

$$15x = 120$$

$$x = 8$$

$$\therefore \text{Mr. gupta} = 7 \times 8 = 56$$

$$\text{Mrs. gupta} = 8 \times 8 = 64$$

$\therefore$ after losing 6 kg by Mr. gupta the ratio becomes 5 : 6.

$$\therefore \frac{56-6}{64-x} = \frac{5}{6}$$

$$300 = 320 - 5x$$

$$5x = 20$$

$$\therefore x = 4 \text{ kg.}$$

51. (d) A : B

$$A : C$$

$$4 : 9$$

$$2 : 3$$

$$B : C$$

$$A : C$$

$$9 : 4$$

$$2 : +3$$

$$\Rightarrow 18 : 8$$

$$: 12$$

$$\therefore (A+B) : (B+C)$$

$$\Rightarrow (18+8) : (18+12)$$

$$26 : 30$$

$$13 : 15$$

52. (c) Let two quantity are A, B

$$\text{Given, } A+B = 3(A-B)$$

$$\Rightarrow A+B = 3A-3B$$

$$\Rightarrow A-3A = -3B-B$$

$$\Rightarrow -2A = -4B$$

$$A = 2B$$

$$A : B = 2 : 1$$

53. (b) Water : glycerine

$$1 : 3 = 240 \text{ cc}$$

$$\Rightarrow 60 : 180$$

Let x litre of water added

$$\therefore \frac{60+x}{180} = \frac{2}{3}$$

$$180 + 3x = 360$$

$$3x = 180$$

$$x = 60$$

Alternate:-

$$\begin{array}{l} W : G \\ 1 : 3 = 4 \text{ units} \\ 2 : 3 \\ 4 \text{ units} = 240 \text{ cc} \end{array}$$

$$1 \text{ unit} = \frac{240}{4} = 60 \text{ cc}$$

54. (a)

	A	:	B	:	C
	3	:	2	:	2
	$\swarrow$		$\searrow$		$\searrow$
	x		x		x
Annual	9	:	6	:	4
Income	$9x$	:	$6x$	:	$4x$

Given, $\frac{A}{3} - 1000 = \frac{C}{4}$

$$\Rightarrow \frac{9x}{3} - 1000 = \frac{4x}{4}$$

$$3x - 1000 = x$$

$$2x = 1000$$

$$x = 500$$

$\therefore$ Income of B is

$$6x = 6 \times 500 = \text{Rs. } 3000$$

55. (a) $(a+b) : (b+c) : (c+a)$

$$6 : 7 : 8$$

Let $6x : 7x : 8x$

$$\therefore a+b+b+c+c+a \Rightarrow 6x+7x+8x$$

$$2a+2b+2c \Rightarrow 21x$$

$$2(a+b+c) = 21x$$

$$\Rightarrow a+b+c = \frac{21}{2}x$$

$$\Rightarrow a+b+c = 14 \text{ given}$$

$$\Rightarrow \frac{21x}{2} = 14$$

$$x = \frac{28}{21} = \frac{4}{3}$$

$$\therefore a+b = 6 \times \frac{4}{3} = 8$$

$$\therefore a+b+c = 14$$

$$c = 14 - 8 = 6$$

56. (c) $5.5a = 0.65b$

$$\frac{55}{10}a = \frac{65}{100}b$$

$$55a = \frac{65}{10}b$$

$$550a = 65b$$

$$a : b = 65 : 550 = 13 : 110$$

57. (d) $x : y$

No. of balls	2	:	3
	$2x$	:	$3x$

$\Rightarrow$ Now 5 balls are taken out of bag if and Put in bag x

$$\therefore \frac{2x+5}{3x-5} = \frac{1}{1}$$

$$\Rightarrow 2x+5 = 3x-5$$

$$x = 10$$

$\therefore$ No. of balls in each bag is

$$x \Rightarrow 2 \times 10 + 5 = 25$$

$$y \Rightarrow 3 \times 10 - 5 = 25$$

58. (d)

Rs. 1	:	50P	:	20P	
Values	$13x$	:	$11x$	:	$7x$
No. of coins	$13x \times 1$	:	$11x \times 2$	:	$7x \times 5$
	$13x$	:	$22x$	:	$35x$

$\therefore$ Given, Total coins

$$= 13x + 22x + 35x = 70x$$

$$70x = 420 \Rightarrow x = 6$$

$\therefore$ No. of 50 paise coins are

$$= 22x = 22 \times 6 = 132$$

59. (b)

Rs. 1	:	50P	:	25P	
	$\swarrow$	$\uparrow$	$\swarrow$	$\uparrow$	
1	:	2	:	1	
$\frac{1}{2}$	:	1	:	$\frac{1}{4}$	
No. of coins $\rightarrow$	$2x$	:	$8x$	:	$4x$
Values of coins $\rightarrow$	$2x \times 1$	:	$8x \times \frac{1}{2}$	:	$4x \times \frac{1}{4}$
Total value $\rightarrow$	$2x$	+	$4x$	+	$x \rightarrow 7x$
	$7x = \text{Rs. } 56$ (Given)				
	$x = \text{Rs. } 8$				

$\therefore$ Value of 50 paise coins are $= 4x$

$$= 4 \times 8 = \text{Rs. } 32$$

$\therefore$ No. of coins of 50 paise are

$$= 32 \times 2 = 64$$

60. (b) $25\% = \frac{25}{100} = \frac{1}{4}$

$$\therefore x : y : z$$

$$5 : 4 : 3$$

$$15 : 12 : 16$$

61. (b) Let P get Rs. x
 Q get Rs. $(x + 30)$
 R get Rs. $(x + 30 + 60)$
 $\therefore$ Total = P + Q + R
 $= x + x + 30 + x + 90$
 $= \text{Rs. } (3x + 120)$
 $\Rightarrow 3x + 120 = 300$
 $3x = 180$
 $x = \text{Rs. } 60$
 $\therefore P : Q : R$
 $60 : 90 : 150$
 $2 : 3 : 5$

62. (a) $a : b :: c : d$
 $a \times d = b \times c$
 So, go through options

(a) $9 \times 16 = 12 \times 12$ ✓

(b) $13 \times 4 = 11 \times 5$ ✗

(c) $30 \times 24 = 45 \times 13$ ✗

(d) $3 \times 5 = 5 \times 2$ ✗

So answer is **12 : 9 :: 16 : 12**

63. (a) Share of son : Wife : Daughter are

S	:	W	:	D
3	:	1	:	1
9	:	3	:	1

Total $\Rightarrow 9x + 3x + x = 13x$

= Share of son = $9x$

Share of daughter = x

= Difference between share of son and share of daughter

$$9x - x = 8x = 10000$$

$$x = \text{Rs. } 1250$$

$$\therefore \text{Total property} = 13x$$

$$= 13 \times 1250 = \text{Rs. } 16250$$

64. (c) The distance covered by policeman in 5 steps is equal to that of thief in 7 steps

$$\Rightarrow 5P = 7T$$

$$P : T$$

$$7 : 5$$

(distance covered in each step)

$\Rightarrow$ and policeman goes 8 steps while thief moves 10 steps

Policeman	:	Thief
Steps	8	: 10
Distance in each step	7	: 5
Speed	$\frac{56}{28}$	: $\frac{50}{25}$

65. (c) According to the question, Mixture of copper and aluminium = 2000 gm

$$30\% \text{ is copper means } = \frac{30}{100} \times 2000$$

$$= 600 \text{ gm copper}$$

Copper	600 gm	aluminium	1400 gm
		+	
20% = 600			
1 unit = 30			
30			
20%			
		$\frac{x}{80\%}$	

$$1400 + x = 2400 \text{ gm}$$

$$x = 1000 \text{ gm}$$

66. (c) Given $\frac{p}{q} = \frac{r}{s} = \frac{t}{u} = \frac{2}{3}$

$$\Rightarrow p = \frac{2}{3}q, r = \frac{2}{3}s, t = \frac{2}{3}u$$

$$\therefore \frac{mp + nr + ot}{mq + ns + ou}$$

$$= \frac{m\left(\frac{2}{3}q\right) + n\left(\frac{2}{3}s\right) + o\left(\frac{2}{3}u\right)}{mq + ns + ou}$$

$$= \frac{2}{3} \left(\frac{mq + ns + ou}{mq + ns + ou} \right) = \frac{2}{3}$$

67. (b) Given $\frac{a}{b} = \frac{b}{c} \Rightarrow b^2 = ac$

$$\Rightarrow b^4 = a^2c^2 \quad (\text{squaring})$$

$$\therefore a^4 : b^4 = a^4 : a^2c^2$$

$$= \boxed{a^2 : c^2}$$

68. (c) Given $p : q : r = 1 : 2 : 4$

$$\text{Let } \frac{p}{1} = \frac{q}{2} = \frac{r}{4} = k$$

$$\Rightarrow p = k, q = 2k, r = 4k$$

Now,

$$\sqrt{5p^2 + q^2 + r^2}$$

$$= \sqrt{5k^2 + (2k)^2 + (4k)^2}$$

$$= k\sqrt{5+4+16}$$

$$= 5k = 5p$$

69. (d) Let $\frac{a}{b} = \frac{c}{d} = k$

$$\Rightarrow a = bk, c = dk$$

$$\text{Now, } \frac{ma + nc}{mb + nd} = \frac{m(bk) + n(dk)}{mb + nd}$$

$$= k \left(\frac{mb + nd}{mb + nd} \right) = k$$

By checking option, (d) is not equal to k.

70. (b) $a + b\sqrt{3} = \frac{1}{2 - \sqrt{3}}$

$$\Rightarrow a + b\sqrt{3} = \frac{1}{2 - \sqrt{3}} \times \frac{2 + \sqrt{3}}{2 + \sqrt{3}}$$

$$\Rightarrow a + b\sqrt{3} = 2 + \sqrt{3}$$

by equating, we get

$$a = 2, \quad b = 1$$

$$\text{Therefore, } \boxed{a : b = 2 : 1}$$

71. (d) $\frac{2}{3}$ of A = 75% of B = 0.6 of C

$$\text{or, } \frac{2}{3} \text{ of A} = \frac{3}{4} \text{ of B} = \frac{3}{5} \text{ of C}$$

$$\text{or, } \frac{2 \times 3}{3 \times 3} \text{ of A} = \frac{3 \times 2}{4 \times 2} \text{ of B} =$$

$$\frac{3 \times 2}{5 \times 2} \text{ of C}$$

$$\text{or } \frac{A}{9} = \frac{B}{8} = \frac{C}{10}$$

$$\therefore \boxed{A : B : C = 9 : 8 : 10}$$

72. (a) Given

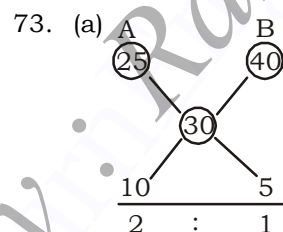
$$4^{3.5} : 2^5$$

$$= \left[(2)^2 \right]^{3.5} : 2^5$$

$$= 2^7 : 2^5$$

$$= 128 : 32$$

$$= 4 : 1$$



74. (a) Boys Girls Teacher

4 _{x8}	3 _{x8}	
	8 _{x3}	1 _{x3}
32	24	3

$$\therefore \text{required ratio} =$$

$$\text{Students Teachers}$$

$$(32 + 24) : 3$$

$$= \boxed{56 : 3}$$

75. (a) Let a, b, c, d be the numbers then mean proportion $\Rightarrow 2 \times 54 = b \times c$

$$\Rightarrow b \times c = 2 \times 3 \times 18$$

$$\Rightarrow b \times c = 6 \times 18$$

Hence mean proportion between 2 and 54 is 6 & 18

76. (a) $\frac{a+b}{\sqrt{ab}} = \frac{4}{1} \Rightarrow \frac{a+b}{2\sqrt{ab}} = \frac{2}{1}$

using componendo & dividendo

$$\frac{a+b+2\sqrt{ab}}{a+b-2\sqrt{ab}} = \frac{2+1}{2-1}$$

$$\Rightarrow \left(\frac{\sqrt{a} + \sqrt{b}}{\sqrt{a} - \sqrt{b}} \right)^2 = \frac{3}{1}$$

$$\Rightarrow \frac{\sqrt{a} + \sqrt{b}}{\sqrt{a} - \sqrt{b}} = \frac{\sqrt{3}}{1}$$

Again using componendo & dividendo

$$\frac{2\sqrt{a}}{2\sqrt{b}} = \frac{\sqrt{3}+1}{\sqrt{3}-1}$$

squaring both sides, we get

$$\frac{a}{b} = \frac{4+2\sqrt{3}}{4-2\sqrt{3}}$$

$$\Rightarrow \frac{a}{b} = \frac{2+\sqrt{3}}{2-\sqrt{3}}$$

$$\Rightarrow \boxed{a : b = 2 + \sqrt{3} : 2 - \sqrt{3}}$$

77. (a) $\frac{x^3 - y^3}{x^2 + xy + y^2} = \frac{5}{1}$

$$\Rightarrow x - y = 5$$

$$(\therefore x^3 - y^3 = (x - y)(x^2 + xy + y^2))$$

then $\frac{x^2 - y^2}{x - y} = \frac{7}{1}$

$$\Rightarrow \frac{(x - y)(x + y)}{x - y}$$

$$= \frac{7}{1}$$

$$x + y = 7 \quad \dots (ii)$$

By solving (i) and (ii),

$$x = 6, y = 1$$

$$\therefore 2x : 3y$$

$$= 12 : 3 = 4 : 1$$

78. (d) Let the number k is to be added.

According to the question,

$$\frac{x+k}{y+k} = \frac{p}{q}$$

$$\Rightarrow qx + kq = py + pk$$

$$\therefore 9 \text{ units} = 4 \times 9 = 36 \text{ years}$$

$\therefore$ A's present age = 36 years

- (c)

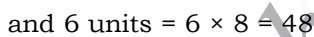
A 5 B
 18 years ago $8_{\times 2}$ $13_{\times 2}$
 present age $5_{\times 5}$ $7_{\times 5}$
 2

	A	B	
18 years ago	16	26	$\left. \begin{array}{l} 26 \\ 35 \end{array} \right\} 9 \times 2 \rightarrow 18$
present age	25	35	

$$\therefore 1 \text{ unit} = \frac{18}{9} = 2$$

$\therefore 25 \text{ units} = 2 \times 25 = 50 \text{ years}$
Therefore, A's present age = 50 years

87. (c)



$$B = 48 + 4 = 52 \text{ years}$$

- Sonali Monali
Current age $5 \times_3$ $3 \times_3$

After 5 years age $10 \times_2$ $7 \times_2$


	Sonali	Monali
Current age	15	9
after 5 years	20	14

$\left. \begin{array}{c} 9 \\ 14 \end{array} \right\} 5 \times 1 \rightarrow 5$

$$\therefore 5 \text{ units} = 5$$
$$\therefore 9 \text{ units} = 1 \times 9 = 9$$

Hence, Present age of Monali
= 9 years

88. (a)

Ist	IIInd	IIIrd
2	3	③
⑤	5	3
10	15	9 = 34 × 2 68

$$\begin{array}{ccc} & \text{GF} & \text{me} \\ 3 \text{ years ago} \rightarrow & 18 \times 4 + 8 & 2 \times 4 + 8 \\ & = 80 & 16 \\ & = 5 : 1 & \end{array}$$

$\therefore$ Required ratio = $\boxed{1 : 5}$

85. (c)

Present age $\rightarrow 3_{\times 3}$ A $\xrightarrow{2}$ B $1_{\times 1}$

4 years ago $\rightarrow 4_{\times 2}$ 1 $\xrightarrow{3}$ 3

$$\therefore 34 \text{ units} = 68$$

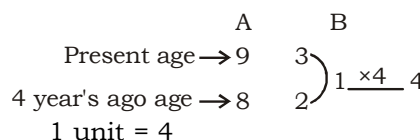
$$\therefore 1 \text{ unit} = \frac{68}{34}$$

$$\therefore \text{2nd no} = \frac{68}{34} \times 15 = 30$$

89. (d) Let the required no. be x

According to question,

- $$\frac{6+x}{7+x} = \frac{15+x}{17+x}$$



$$\Rightarrow x^2 + 23x + 102 = x^2 + 22x + 105$$

$$\Rightarrow \boxed{x=3}$$

90. (b) Let no. be x.

According to question,

$$\frac{6+x}{14+x} = \frac{18+x}{38+x}$$

$$\Rightarrow x^2 + 44x + 228 = x^2 + 32x + 252$$

$$\Rightarrow 12x = 24$$

$$\Rightarrow x = 2$$

Alternate:-

Go through option,

By taking option (b)

$$\frac{6+2}{14+2} = \frac{18+2}{38+2}$$

$$\Rightarrow \frac{8}{16} = \frac{20}{40}$$

$$\Rightarrow \frac{1}{2} = \frac{1}{2}$$

Hence, option (b) is correct.

91. (c) Let the numbers are x & y.

According to question,

$$(x+y)^2 = 4xy$$

$$\Rightarrow x^2 + y^2 + 2xy = 4xy$$

$$\Rightarrow x^2 + y^2 - 2xy = 0$$

$$\Rightarrow (x-y)^2 = 0$$

$$\Rightarrow x = y$$

$$\therefore \boxed{x:y=1:1}$$

92. (b) Let three numbers are 2x, 3x and 4x.

$$(2x)^2 + (3x)^2 + (4x)^2 = 1856$$

$$\Rightarrow 4x^2 + 9x^2 + 16x^2 = 1856$$

$$\Rightarrow 29x^2 = 1856$$

$$\Rightarrow x^2 = 64$$

$$\Rightarrow x = 8$$

$$\text{Numbers are } \rightarrow 2x = 2 \times 8 = 16$$

$$3x = 3 \times 8 = 24$$

$$4x = 4 \times 8 = 32$$

93. (a) Ist Number 2 IInd Number 3 = 5 $\times 25 \rightarrow 125$

$$\therefore 5 \text{ units} = 125$$

$$\therefore 1 \text{ unit} = 25$$

$$\therefore \text{Ist number} = 2 \times 25 = 50$$

$$\text{IInd number} = 3 \times 25 = 75$$

94. (c) Let the numbers are 2x, 3x and 5x.

According to question,

$$(2x)^2 + (3x)^2 + (5x)^2 = 608$$

$$\Rightarrow 4x^2 + 9x^2 + 25x^2 = 608$$

$$\Rightarrow 38x^2 = 608$$

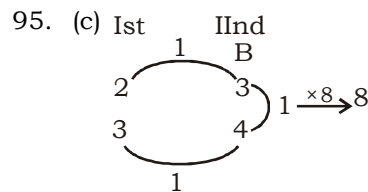
$$\Rightarrow x^2 = 16$$

$$\Rightarrow x = 4$$

$$\text{Ist number} = 2x = 2 \times 4 = 8$$

$$\text{IInd number} = 3x = 3 \times 4 = 12$$

$$\therefore \text{3rd Number} = 5x = 5 \times 4 = 20$$



$$1 \text{ unit} = 8$$

$$\therefore \text{sum of number} = (2+3) \times 8 = 40$$

96. (d) Let the numbers are 3x and 4x.

According to question

$$3 \times 4x = 180$$

$$\Rightarrow x = 15$$

$$\therefore \text{Ist no.} = 15 \times 3 = 45$$

97. (c) Let the numbers are 3x and 4x

According to question

$$3 \times 4x = 120$$

$$x = 10$$

$$\therefore \text{sum of no.} = 3x + 4x = 7x$$

$$= 7 \times 10$$

$$= \boxed{70}$$

98. (a) Let the 1st number be 3x and 2nd number be 4x.

$$\text{HCF of two numbers} = 15$$

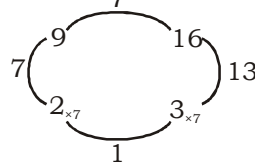
$$\text{or, } x = 15$$

$$\text{Hence, the sum of two numbers}$$

$$= 3x + 4x = 7x$$

$$= 7 \times 15 = 105$$

99. (c) Ist IInd



$$\begin{array}{cc} \text{I} & \text{II} \\ 9 & 16 \\ 14 & 21 \end{array} \left. \vphantom{\begin{array}{cc} 9 & 16 \\ 14 & 21 \end{array}} \right\} 5 \times 3 \rightarrow 15$$

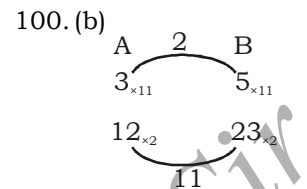
$$5 \text{ units} = 15$$

$$\therefore 1 \text{ unit} = 3$$

$$A = 9 \times 3 = 27$$

$$B = 16 \times 3 = 48$$

$$\therefore \text{Greater No. } 48$$



$$\begin{array}{cc} \text{A} & \text{B} \\ 33 & 55 \\ 24 & 46 \end{array} \left. \vphantom{\begin{array}{cc} 33 & 55 \\ 24 & 46 \end{array}} \right\} 9 \times 1 \rightarrow 9$$

$$\therefore 9 \text{ units} = 9$$

$$\therefore 1 \text{ unit} = 1$$

$$\therefore 33 \text{ units} = 1 \times 33 = 33$$

$$\text{Smaller number} = 33$$

101. (c) Let the numbers of boys = x and number of girls = y

Case-I

$$\frac{x}{y-15} = \frac{2}{1}$$

$$x = 2y - 30 \dots\dots\dots (i)$$

Case- II

$$\frac{x-45}{y-15} = \frac{1}{5}$$

$$\Rightarrow 5x - 225 = y - 15$$

$$\Rightarrow 5x = y + 210$$

$$\Rightarrow 5(2y - 30) = y + 210 \text{ (from i)}$$

$$\Rightarrow 10y - 150 = y + 210$$

$$\Rightarrow 9y = 360$$

$$\Rightarrow y = 40$$

$$\text{Hence numbers of Girls} = 40.$$

102. (c) Boys Girls

$$\begin{array}{cc} 13 & 9 = 22 \times 30 \rightarrow 660 \\ \downarrow \times 30 & \downarrow \times 30 \\ 390 & 270 \end{array}$$

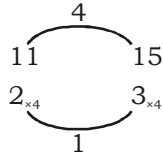
Let x number of boys left the class.

$$\Rightarrow \frac{390-x}{270+30} = \frac{6}{5}$$

$$\Rightarrow \frac{390-x}{300} = \frac{6}{5}$$

$$\Rightarrow \boxed{x=30}$$

103. (b)



or, 11 15
8 12 } 3

Hence, the required number = 3

104. (d) Average of 11 numbers = 36

and average of 9 numbers = 34

∴ Sum of last two numbers
= $36 \times 2 + 2 \times 9$

= $72 + 18 = 90$

Let the two numbers be $2x$ & $3x$

∴ $2x + 3x = 90$

⇒ $5x = 90$

⇒ $x = 18$

Hence, the smaller number

= $2x = 2 \times 18 = 36$

105. (c) A B
7 5 = 12 $\xrightarrow{\frac{9}{2}}$ $54 + 9 = 63$

1×7 1×7 (7) $2 \times \frac{9}{2} 9$

∴ 12 units = 63

∴ 1 units = $\frac{63}{12}$

∴ 7 units = $\frac{63}{12} \times 7$

= $\frac{147}{4} = 36\frac{3}{4}$ litre.

106. (c) Amount of milk left
= initial amount

$\left(1 - \frac{\text{Amount taken out}}{\text{Initial amount}}\right)$

Where, n = No. of repetitions,

= $60 \left(1 - \frac{6}{60}\right)^3$

= $60 \times \frac{9}{10} \times \frac{9}{10} \times \frac{9}{10}$

= 43.74 litre

Alternate:

$\frac{6}{60} = \frac{1}{10}$

$\frac{10}{10} \quad \frac{9}{9}$
 $\frac{10}{10} \quad \frac{9}{9}$
 $\frac{10}{10} \quad \frac{9}{9}$

 $1000 \quad 729$
↓
60

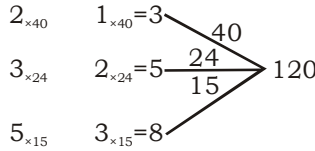
∴ 1000 units = 60

∴ 1 unit = $\frac{60}{1000}$

∴ 729 units = $\frac{60}{1000} \times 729$

= 43.74 litres.

107. (b) Acid Water



or

Acid Water

80 40

72 48

75 45

227 : 133

108. (b)

Cu Tin

1×77 $3 \times 77 = 4$

2×44 $5 \times 44 = 7$

3×28 $8 \times 28 = 11$

New alloy

Or

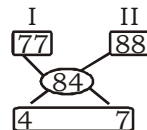
Cu Tin

1st alloy 77 231

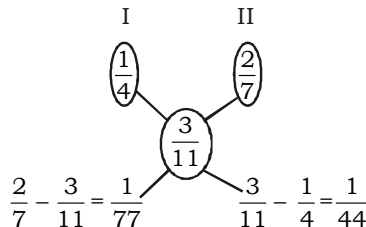
2nd alloy 88 220

New 84 224

By alligation,



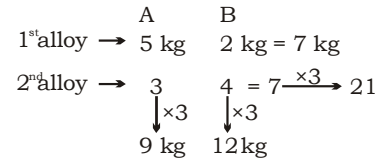
Alternate:



or, $\frac{1}{77} : \frac{1}{44}$

or, 4 : 7

109. (d)

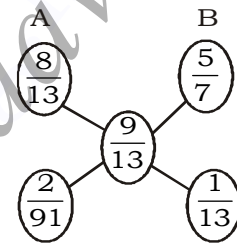


New Alloy 14kg : 14 kg

Ratio → 1 : 1

110. (d) $69\frac{3}{15}\% = \frac{900}{13} \times \frac{1}{100} = \frac{9}{13}$

Now,



∴ Required ratio = 2 : 7

111. (b) Wine Water
3 1 = 4 + 2 = 6

1×3 1×3

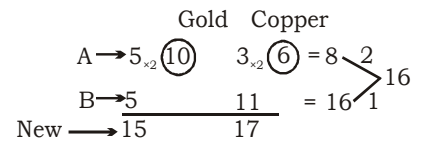
Required fraction = $\frac{2}{6} = \frac{1}{3}$

112. (a) Milk Water
7 2 = 9 $\xrightarrow{\times 81}$ 729
7 3 $\xrightarrow{\times 81}$ 81 litre

∴ 9 units = 729

∴ 1 unit = $\frac{729}{9} = 81$ litres.

113. (c)



∴ Required ratio = 15 : 17

114. (a) 1st 1st
 $\frac{3}{5}$ $\frac{4}{9}$

$\frac{1}{2}$

$\frac{1}{18}$ $\frac{1}{10}$

or, 5 : 9

Now, required answer

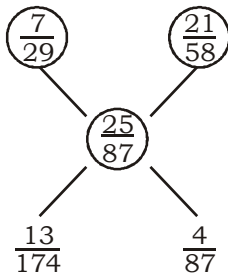
$$9 \times \frac{3}{5} = \frac{27}{5} = \boxed{5\frac{2}{5}} \text{ litres}$$

115. (d) acid Water
 $\frac{1}{1} \times \frac{2}{3} = \frac{2}{3}$
 $\frac{1}{1} \times \frac{3}{2} = \frac{3}{2}$

acid water
 $\frac{2}{3} \times 6 = 4$
 $\frac{3}{2} \times 6 = 9$
 $6 = 9 \text{ units}$

$\therefore 1 \text{ unit} = 5 \text{ litre}$
 $\therefore 9 \text{ units} = 9 \times 5$
 $= 45 \text{ litres}$

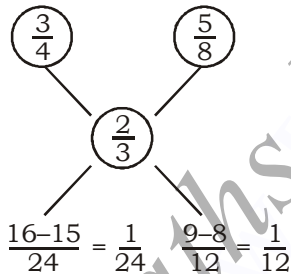
116. (a) TYPE -I TYPE -II



$= \boxed{13:8}$

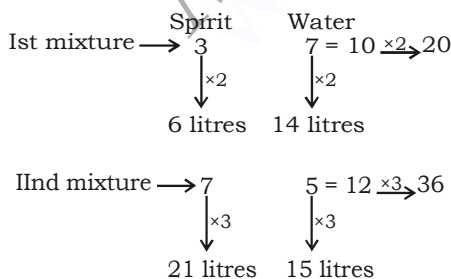
therefore the required ratio
 $= 13 : 8$

117. (a) TYPE -I TYPE -II



$\therefore \text{Required Ratio} \rightarrow 1 : 2$

118. (c)



Now,

	Spirit	Water
Ist mixture	6	14
2nd mixture	21	15
New mixture	27	29

119. (c) A B

$\frac{7}{7} \times \frac{5}{9} = \frac{12}{9} = \frac{4}{3}$
 $\frac{5}{9} \times \frac{7}{7} = \frac{5}{9}$

$\therefore 4 \text{ units} = 9$

$\therefore 1 \text{ unit} = \frac{9}{4}$

$\therefore 12 \text{ units} = \frac{9}{4} \times 12 = 27$

$\therefore \text{initial amount} = 27 + 9$
 $= 36 \text{ litres}$

Now $\therefore 12 \text{ units} = 36$

$\therefore 1 \text{ unit} = 3$

$\therefore 7 \text{ units} = 7 \times 3$
 $= 21 \text{ litres}$

Hence, liquid A = 21 litres.

120. (c) Milk Water

	Milk	Water
Ist $\rightarrow$	5	3
2nd $\rightarrow$	2	1
3rd $\rightarrow$	3	2
4th $\rightarrow$	7	4

Milk% =

1st $\frac{5}{8} \times 100 = 67.5\%$

2nd $\frac{2}{3} \times 100 = 66.6\%$

3rd $\frac{3}{5} \times 100 = 60\%$

4th $\frac{7}{11} \times 100 = 63\frac{7}{11}\%$

Hence in 3rd vessel, quantity of milk in minimum

121. (d)

	Alcohol	Water
1 st glass	$2 \times 5(10)$	$1 \times 5(5) = 3 \times 5 = 15$
2 nd glass	$3 \times 3(9)$	$2 \times 3(6) = 5 \times 3 = 15$
3 rd glass	19	11

$\therefore \text{The ratio of alcohol and water in third glass} = 19 : 11$

122. (b) Milk Water

$\frac{27}{3 \times 9} = \frac{5}{1 \times 9} = \frac{32}{80} \rightarrow 80$

$\therefore 32 \text{ units} = 80 \text{ litres}$

$\therefore 1 \text{ unit} = \frac{80}{32}$

$\therefore 4 \text{ units} = \frac{80}{32} \times 4 = 10 \text{ litres}$

123. (c) Acid taken out = $\frac{4}{20} = \frac{1}{5}$

Initially Final

	Initially	Final
	5	4
	5	4
	25	16

Required Ratio = 16 : 25

124. (d) Milk Water

	Milk	Water
Vessel-I	5×15	$2 \times 15 = 7 \times 5 \times 3$
Vessel-II	4×14	$1 \times 14 = 5 \times 7 \times 2$
Vessel-III	4×7	$1 \times 7 = 5 \times 7 \times 1$

or

	Milk	Water
Vessel-I	75	30 = 105
Vessel-II	56	14 = 70
Vessel-III	28	7 = 35

Now Taking $\frac{1}{3}$ of 1st, $\frac{1}{2}$ of 2nd

2nd $\frac{1}{7}$ of 3rd

	Milk	Water
Vessel-I	25	10 = 35
Vessel-II	28	7 = 35
Vessel-III	4	1 = 5
	57	18 = 75

$\therefore \% \text{ of water} = \frac{18}{75} \times 100 = 24\%$

125. (c) Let the mixture = 5kg
 $\therefore \text{cost price} = (35 \times 2 + 40 \times 3)$
 $= 190$

$\& \text{ SP} = 1 \times 46 + 4 \times 55 = 266$

$\therefore \text{Profit} = 266 - 190 = 76$

$\therefore \text{Profit}\% = \frac{76}{190} \times 100 = 40\%$

126. (a) Income A B C
 $\begin{array}{ccc} 3 & 7 & 4 \\ \downarrow \times 800 & \downarrow \times 800 & \downarrow \times 800 \\ ₹ 2400 & ₹ 5600 & ₹ 3200 \end{array}$

Expense of A = 2400 - 300 = 2100

Exp. A B C
 $\begin{array}{ccc} 4 & 3 & 5 \\ \downarrow \times 525 & \downarrow \times 525 & \downarrow \times 525 \\ 2100 & 1575 & 2625 \end{array}$

$\therefore$ Saving of B = 5600 - 1575
 = ₹ 4025

and, saving of C = 3200 - 2625 = ₹ 575

127. (a) Let Income of A, B & C are 7x, 9x & 12x

& Expenses of A, B & C are 8y, 9y and 15 y.

According to the question,

$\frac{1}{4} \times 7x = 7x - 8y$

$\Rightarrow 7x = 28x - 32y$

$\Rightarrow 21x = 32y$ (i)

A's saving = $\frac{7x}{4}$

B's Saving = 9x - 9y

= $9x - 9 \times \frac{21}{32}x = \frac{99}{32}x$

and, C's saving = 12x - 15y

= $12x - 15 \times \frac{21}{32}x = \frac{69}{32}x$

$\therefore$ Ratio of Saving of A, B & C

= $\frac{7x}{4} : \frac{99}{32}x : \frac{69}{32}x$

= 56 : 99 : 69

128. (a) $\begin{array}{ccc} x & & y \\ \text{Income} & 4 \times 5 & 3 \times 5 \\ \text{Expense} & 12 & 7 \\ & 5 & \end{array}$

Income 20 15 $\downarrow \times 400 \rightarrow 3200$
 Expense 12 7

$\therefore$ 8 units = 3200

$\therefore$ 1 unit = $\frac{3200}{8}$

$\therefore$ 20 units = $\frac{3200}{8} \times 20$

= ₹ 8000

Hence, Income of x = ₹ 8000

129. (b)

₹ 1 50P 25P

No. of $\rightarrow$ 2 3 4
 coins

value $\rightarrow$ 2 1.5 1 = $4.5 \xrightarrow{\times 40} 180$
 of coins

$\therefore$ 4.5 units = 180

$\therefore$ 1 unit = $\frac{180}{4.5}$

$\therefore$ 3 units = $\frac{180}{4.5} \times 3 = 120$

Number of 50 paise coins = 120

130. (a)

₹ 1 50P 25P

values $\rightarrow$ 13 11 7
 of coins

No. of $\rightarrow$ 13 22 28 = 63 $\rightarrow$ 378
 coins

$\therefore$ 63 units = 378

$\therefore$ 1 unit = $\frac{378}{63}$

$\therefore$ 22 units = $\frac{378}{63} \times 22 = 132$

Number of 50 paise coins = 132

131. (b)

50P 25P 10P

No. of $\rightarrow$ 2 3 5
 coins

Values $\rightarrow$ 1 0.75 0.5 = 2.25
 of coins

$\therefore$ 2.25 units = 90

$\therefore$ 1 = $\frac{90}{2.25}$

$\therefore$ 3 units = $\frac{90}{2.25} \times 3 = 120$

Number of 25 paise coins = 120

132. (b)

₹ 1 50P 25P

No. of $\rightarrow$ 3 8 20 = 31
 coins

Values $\rightarrow$ 3 4 5 = 12
 of coins

$\therefore$ 12 units = 372

$\therefore$ 1 unit = $\frac{372}{12}$

$\therefore$ 31 units = $\frac{372}{12} \times 31 = 961$

The total number of coins = 961

133. (d)

1Rs 50p

Values $\rightarrow$ 13 11
 of coins

No. of $\rightarrow$ 13 22 = 35 $\rightarrow$ 210
 coins

$\therefore$ 35 units = 210

$\therefore$ 1 unit = $\frac{210}{35}$

$\therefore$ 13 units = $\frac{210}{35} \times 13 = 78$

The number of 1 rupees coins = 78

134. (b)

₹ 1 ₹ 5 ₹ 10

No. of $\rightarrow$ 1 1 1 = 3
 notes

Values $\rightarrow$ 1 5 10 = 16 $\xrightarrow{\times 40} 640$
 of notes

$\therefore$ 16 units = 640

$\therefore$ 1 unit = $\frac{640}{16}$

$\therefore$ 3 units = $\frac{640}{16} \times 3 = 120$

Total number of notes = 120

135. (c)

	A	B	C
Salaries	1	3	4
	100	300	400
	$\downarrow +5\%$	$\downarrow +10\%$	$\downarrow +15\%$
	105	330	460
	21	66	92

$$136. (b) A = \frac{2}{9} B \Rightarrow A : B = 2 : 9$$

$$= 4 : 18$$

$$C = \frac{3}{4} A \Rightarrow C : A = 3 : 4$$

$$\begin{array}{ccc} \text{Share of A} & B & C \\ 4 & 18 & 3 = 25 \xrightarrow{\times 50} 1250 \\ \downarrow \times 50 & \downarrow \times 50 & \downarrow \times 50 \end{array}$$

$$\boxed{200 \quad 900 \quad 150}$$

$$\therefore 25 \text{ units} = 1250$$

$$\therefore 1 \text{ unit} = 50$$

$$\therefore \text{share of A} = 4 \times 50 = ₹ 200$$

$$\text{share of B} = 18 \times 50 = ₹ 900$$

$$\text{share of C} = 3 \times 50 = ₹ 150$$

137.(d)

$$\begin{array}{ccc} A & B & C \\ 3 & 4 & \\ \hline & 3 & 4 \\ 9 & 12 & 16 \rightarrow 37 \xrightarrow{\times 10} 370 \\ \downarrow \times 10 \end{array}$$

$$\boxed{90}$$

$$\therefore 37 \text{ units} = 370$$

$$1 \text{ unit} = 10$$

$$\therefore 9 \text{ units} = 9 \times 10 = ₹ 90$$

$$\text{Hence, share of A} = ₹ 90$$

$$138. (c) \text{ Given } \frac{1}{2} A = \frac{1}{3} B = \frac{1}{4} C$$

$$\text{or, } A:B:C = 2:3:4 = 9 \times 100 \rightarrow 900$$

$$\therefore 9 \text{ units} = 900$$

$$\therefore 1 \text{ unit} = 100$$

$$\therefore A's \text{ money} = 2 \times 100 = ₹ 200$$

$$B's \text{ money} = 3 \times 100 = ₹ 300$$

$$C's \text{ money} = 4 \times 100 = ₹ 400$$

139. (a) **Case-I**

$$\begin{array}{ccc} A & B & C \\ \frac{1}{4} & \frac{1}{5} & \frac{1}{6} \\ 15 & 12 & 10 = 37 \xrightarrow{15} 555 \end{array}$$

$$\begin{array}{ccc} \downarrow \times 15 & \downarrow \times 15 & \downarrow \times 15 \\ ₹ 225 & ₹ 180 & ₹ 150 \end{array}$$

Case-II (By mistake)

$$\begin{array}{ccc} A & B & C \\ 4 & 5 & 6 = 15 \times 37 \rightarrow 555 \end{array}$$

$$\begin{array}{ccc} \downarrow \times 37 & \downarrow \times 37 & \downarrow \times 37 \\ ₹ 148 & ₹ 185 & ₹ 222 \end{array}$$

$$\text{Amount in excess received by C} = 222 - 150 = ₹ 72$$

140. (a)

	1 st train	2 nd train	
fare	3	1	
No. of Passenger	1	50	
	3	50	$= 53 \xrightarrow{\times 25} 1325$
	$\downarrow \times 25$	$\downarrow \times 25$	
	75	1250	

$$\therefore 53 \text{ units} = 1325$$

$$\therefore 1 \text{ unit} = \frac{1325}{53}$$

$$\therefore 50 \text{ units} = \frac{1325}{53} \times 50 = ₹ 1250$$

141. (a)

A	B	C	
3	2		
	3	2	
9	6	4	$= 19 \xrightarrow{\times 19} 361$
$\downarrow \times 19$			
171			

$$\therefore 19 \text{ units} = 361$$

$$\therefore 1 \text{ unit} = 19$$

$$\therefore 9 \text{ units} = 19 \times 19 = 171 \text{ runs}$$

142. (a)

	Sachin	Sourabh	Vinod	
	3	2		
		3	2	
Ratio of runs	9	6	4	$= 19 \times 15 \rightarrow 285$
	$\downarrow \times 15$			
	135			

$$\text{Since, } 19 \text{ units} = 285$$

$$\therefore 9 \text{ units} = 9 \times 15 = 135$$

143. (c) Refrigerator Television

5	3
$\downarrow \times 2750$	$\downarrow \times 2750$
13750	5500

$$\therefore \text{Price of Refrigerator} = ₹ 13750$$

144. (c)

	A	B	C
Speed	4	3	5
Time	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{5}$

$$= 15 : 20 : 12$$

145.(b) According to the question,

$$10\% \text{ of girls} = \frac{1}{20} \text{ of boys}$$

$$\text{or, } \frac{1}{10} \text{ of girls} = \frac{1}{20} \text{ of boys}$$

$$\text{or, boys : girls} = 2 : 1$$

146. (a) Story Books other Books

7 ₂ = 14	2 ₂ = 4
1	4
15	

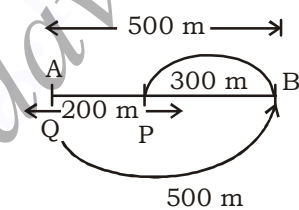
$$\therefore 14 \text{ units} = 1512$$

$$\therefore 1 \text{ unit} = \frac{1512}{14} = 108$$

$$\therefore \text{Number of story books collected} = 108$$

147.(b)

	P	Q
Speed	3	5



$$\text{Time taken by P} = \frac{300}{3} = 100 \text{ s}$$

$$\text{In } 100 \text{ s, distance covered by Q} = 100 \times 5 = 500 \text{ m.}$$

Hence both reach at the same time

148. (a) Boys : Girls

4	3	$= 7 \xrightarrow{\times 222} 1554$
$\downarrow \times 222$	$\downarrow \times 222$	
888	666	

Let x boys left the school.

$$\text{Now, } \frac{666 + 30}{888 - x} = \frac{6}{7}$$

$$\Rightarrow \frac{696}{888 - x} = \frac{6}{7}$$

$$\Rightarrow 888 - x = 812$$

$$\Rightarrow x = 76$$

149. (b)

	I st year	II nd year
Income	$\rightarrow 2$	$\rightarrow 3$
	$\downarrow \times 15000$	$\downarrow \times 15000$
	Rs. 30,000	Rs. 45,000
Exp.	$\rightarrow 5$	$\rightarrow 9$
	$\downarrow \times 5000$	$\downarrow \times 5000$
	Rs. 25,000	Rs. 45,000

Hence,

$$\text{Total saving} = (30,000 - 25,000) + (45,000 - 45,000) = \text{Rs. 5,000}$$

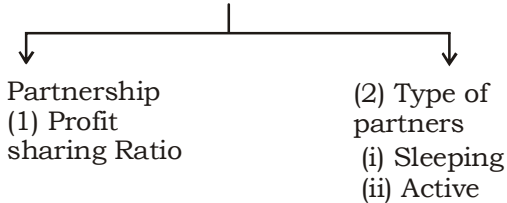


07

PARTNERSHIP

◆ When two or more than two persons run a business together, then it is called partnership and the persons are called partners.

Partnership



(1). **Profit sharing Ratio** : The profit is shared between partners in the ratio of the product of money and the time duration.

e.g. A invests Rs. 12000 for 5 months and B invests Rs. 6000 for 10 months then the ratio of their profit

A		B
12000 × 5		6000 × 10
60	:	60
1	:	1

(2) Type of Partners

- (i) **Sleeping Partner** : This type of partners put only money. So they only get the profit in the ratio of money invested.
- (ii) **Active Partner** : This type of partners not only put their money but also run the business and they get extra profit for doing so according to conditions, and the remaining profit is shared in the ratio of their capital.

Example

1. Rakesh Yadav and Bhuvnesh started a business by investing ₹ 36,000 and ₹ 63,000. Find the share of each, out of the annual profit of ₹ 5500.

- (a) ₹ 2000, ₹ 3500
(b) ₹ 2500, ₹ 3500
(c) ₹ 3500, ₹ 2500
(d) None of these

Sol. (a)

Rakesh Yadav : Bhuvnesh
Capital → 36,000 : 63,000
4 : 7

Note → When time is same then profit will be divided in the ratio of their capital.

$$\therefore (4 + 7) \text{ units} = ₹ 5500$$

$$11 \text{ units} = ₹ 5500$$

$$1 \text{ unit} = ₹ \frac{5500}{11} = ₹ 500$$

$$\text{Share of Rakesh Yadav} = 500 \times 4 = ₹ 2000$$

$$\text{Share of Bhuvnesh} = 500 \times 7 = ₹ 3500$$

2. A starts a business with ₹ 50,000. After 3 months B joins him with ₹ 70,000. At the end of the year, in what ratio should they share the profit?

- (a) 12 : 13 (b) 13 : 12
(c) 11 : 15 (d) 20 : 21

Sol. (d)

	A	B
Capital →	50,000	70,000
	5	7
	12	9
Time →	12	9
Profit →	60	63
	20	21

Required Ratio of Profits
= 20 : 21

3. Rakesh Yadav started a business by investing ₹ 36,000. After 4 months Bhuvnesh joined him with some investment. At the end of the year, the total profit was divided between them in the ratio 9 : 7. How much capital was invested by Bhuvnesh in the business?

- (a) ₹ 40,000 (b) ₹ 42,000
(c) ₹ 41,000 (d) None of these

Sol. (b) Let the capital invested by Bhuvnesh be ₹ x

	Rakesh Yadav	Bhuvnesh
Capital →	36,000	x
Time →	12	8
	3	2

Profit → 1,08,000 : 2x
According to the question,

$$\frac{1,08,000}{2x} = \frac{9}{7}$$

$$x = \frac{1,08,000}{18} \times 7 = 42,000$$

Required investment by Bhuvnesh = ₹ 42,000

Alternate:-

Note :- To save your valuable time in such type of question try to use below given formula.

$$\frac{C_1 \times T_1}{C_2 \times T_2} = \frac{P_1}{P_2}$$



Where C_1 and C_2 are the capitals.

T_1 and T_2 are time periods.

P_1 and P_2 are profits.

Let capital invested by Bhuvnesh = ₹ x

$$\frac{36000 \times 12}{x \times 8} = \frac{9}{7}$$

$$x = ₹ 42000$$

4. A started some business with ₹ 26,000. After 3 months B joined him with ₹ 16,000. After some more time C joined them with ₹ 25,000. At the end of the year, out of the total profit of ₹ 15,453, C gets ₹ 3825 as his share. How many months after B joined the business, did C join?

- (a) 3 (b) 4
(c) 5 (d) None of these

Sol. (a)

A : B : C

Capital → 26000 : 16000 : 25000

26 : 16 : 25

Time → 12 : 9 : T

Profit → 312 : 144 : 25T

According to the question,
(312 + 144 + 25T) units = 15,453

$$1 \text{ unit} = \frac{15,453}{(456 + 25T)}$$

$$\text{Share of C} = \frac{15,453}{(456 + 25T)} \times 25T$$

$$= \frac{15,453}{(456 + 25T)} \times 25T = 3825$$

Note: Because C's share = ₹ 3825.

$$101T = 456 + 25T$$

$$76T = 456$$

$$T = 6 \text{ months}$$

$$\text{Required time} = (9 - 6) = 3 \text{ months}$$

Therefore, C joined 3 months after B joined.

5. A, B and C started a business with their investments in the ratio 1 : 2 : 4. After 6 months A invested half the more amount as before and B invested the same amount as before while C withdrew $\frac{1}{4}$ th of the his investment. Find the ratio of their profits at the end of the year.
(a) 5 : 12 : 13 (b) 5 : 11 : 14
(c) 5 : 12 : 14 (d) None of these

Sol. (c) Note: We can assume values as per our need but the ratio of values should not be changed.

A : B : C

Initial capital → $2x : 4x : 8x$

Total capital invested by A

$$= (2x \times 6 + 3x \times 6) = 30x$$

Total capital invested by B

$$= (4x \times 6 + 6 \times 8x) = 72x$$

Total capital invested by C

$$= (6 \times 8x + 6x \times 6)$$

$$= (48x + 36x) = 84x$$

New ratio of capitals:

A : B : C

Capital → $30x : 72x : 84x$

Profit → 5 : 12 : 14

Note: Profit would be divided in the ratio of their capitals.

Required ratio of their profit

$$= 5 : 12 : 14$$

6. A started a business with ₹ 52,000 and after 4 months B joined him with ₹ 39,000. At the end of the year, out of the total profit B received total ₹ 20,000 including 25% of the profit as commission for managing the business. What amount did A receive?

- (a) ₹ 20,000 (b) ₹ 10,000
(c) ₹ 15,000 (d) None of these

Sol. (a)

A : B

Capital → 52,000 : 39,000

4 : 3
12 : 8
3 : 2

Profit → 12 : 6
2 : 1

Let profit of A be 200 units and profit of B be 100 units.

Total profit = 300 units

For Managing business B

$$\text{received} = \frac{300 \times 25}{100} = 75 \text{ units}$$

Note: Remaining profit will be divided in the ratio of their capitals.

$$\therefore \text{Profit of A} = \frac{225}{3} \times 2 = 150 \text{ units}$$

$$\text{Profit of B} = \frac{225}{3} \times 1 = 75 \text{ units}$$

$$\text{Total profit of B} = (75 + 75) = 150 \text{ units}$$

According to the question,

$$150 \text{ units} = ₹ 20,000$$

$$1 \text{ unit} = ₹ \frac{20,000}{150}$$

$$150 \text{ units} = ₹ \frac{20,000}{150} \times 150$$

$$= ₹ 20,000 = \text{Profit of A}$$

7. A working partner gets 20% as his commission of the profit after his commission is paid. If the working partner's commission is ₹ 8000, Then what is the total profit in the business?

- (a) ₹ 47,000 (b) ₹ 45,000
(c) ₹ 48,000 (d) None of these

Sol. (c) Let the total profit = ₹ k .

According to the question,

Remaining profit after paying 20% to working

Partner as commission = $(k - 8000)$

$$\therefore (k - 8000) \times \frac{20}{100} = 8000$$

$$k = 48000$$

$$\therefore \text{Total profit} = ₹ 48000$$

8. Rakesh Yadav Reader publication makes a profit of 9,00,000, 20% of which is paid as taxes. If the rest is divided among the partners P, Q and R in the ratio $1 : 1 \frac{1}{2} : 2$, then the shares of P, Q and R are respectively :

- (a) ₹ 2,40,000; ₹ 3,20,000; ₹ 1,60,000



- (b) ₹ 3,20,000; ₹ 2,40,000;
₹ 1,60,000
(c) ₹ 1,60,000; ₹ 3,20,000;
₹ 2,40,000
(d) ₹ 1,60,000; ₹ 2,40,000;
₹ 3,20,000

Sol. (d) P : Q : R

$$\text{Capital} \rightarrow 1 : \frac{3}{2} : 2$$

$$\text{Profit} \rightarrow 2 : 3 : 4$$

Note : Profit would be divided in the ratio of their capitals.

$$\text{Profit} = (2x + 3x + 4x) = 9x \text{ units}$$

According to the question,

$$9x = 9,00,000 \times \frac{80}{100}$$

$$9x = 72,00,00$$

$$x = 8,00,00$$

$$\text{Profit of P} = 2x = 2 \times 80,000$$

$$= ₹ 1,60,000$$

$$\text{Profit of Q} = 3x = 3 \times 80,000$$

$$= ₹ 2,40,000$$

$$\text{Profit of R} = 4x = 4 \times 80,000$$

$$= ₹ 3,20,000$$

9. We have to divide a sum of ₹ 13,950 among three persons A, B and C. B must get the double of A's share and C must get ₹ 50 less than the double of B's share. The share of A will be :

(a) ₹ 1950 (b) ₹ 1981.25

(c) ₹ 2000 (d) ₹ 2007.75

Sol. (c) Let the share of A = ₹ x
According to the question,

$$A : B : C$$

$$\text{Capital} \rightarrow x : 2x : (4x - 50)$$

$$(x + 2x + 4x - 50) = 13,950$$

$$7x - 50 = 13,950$$

$$7x = 14,000$$

$$x = 2000$$

$$\text{Share of A} = ₹ 2000$$

10. X and Y are partners in a business. They invest in the ratio 5 : 6, at the end of 8 months X withdraws. If they receive profits in the ratio 5 : 9. Find how long Y's investment was used?

(a) 12 months (b) 10 months

(c) 15 months (d) 14 months

Sol. (a) Let Y's investment is used for T months → Now by using formula.

$$\frac{5 \times 8}{6 \times T} = \frac{5}{9}$$

$$T = 12 \text{ months}$$

11. A, B and C subscribe ₹ 47000 for a business. If A subscribes ₹ 7,000 more than B and B ₹ 5,000 more than C, then out of total profit of ₹ 4700, C receives.

(a) ₹ 1200 (b) ₹ 4500

(c) ₹ 1000 (d) None of these

Sol. (c) Let C subscribes the business = ₹ x

$$A : B : C$$

$$\text{Capital} \rightarrow (x + 12000) : (x + 5000) : x$$

Note : Profit would be divided in the ratio of their capitals.

According to the question,

$$(x + 12000) + (x + 5000) + x$$

$$= 47000$$

$$3x + 17000 = 47000$$

$$3x = 30000$$

$$x = 10,000$$

$$A : B : C$$

$$\text{Capital} \rightarrow 22,000 : 15,000 : 10,000$$

$$\text{Profit} \rightarrow 22 : 15 : 10$$

$$(22 + 15 + 10) \text{ units} = 4700$$

$$1 \text{ unit} = \frac{4700}{47} = 100$$

$$\text{Share of C} = 10 \text{ units} = 10 \times 100$$

$$= ₹ 1000$$

12. ₹ 11250 are divided among A, B and C so that A may receive one half as much as B and C together receive and B receives one-fourth of what A and C together receive. The share of A is more than that of B by.

(a) ₹ 2500 (b) ₹ 1500

(c) ₹ 1800 (d) ₹ 650

Sol. (b) A : B+C

$$1_{\times 5} : 2_{\times 5} \dots \dots (I)$$

$$B : A+C$$

$$1_{\times 3} : 4_{\times 3} \dots \dots (II)$$

Note: The total sum of A, B and C will be same. so equate the sum of both the equations.

After that new ratio,

$$A : B+C$$

$$5 : 10 \dots \dots (III)$$

$$B : A+C$$

$$3 : 12 \dots \dots (IV)$$

From equation (iii) and (iv)

$$A : B : C$$

$$5 : 3 : 7$$

According to the question,

$$(5 + 3 + 7) \text{ units} = ₹ 11250$$

$$15 \text{ units} = ₹ 11250$$

$$1 \text{ unit} = ₹ 750$$

Difference in shares of A and B

$$= (5 - 3) \times 750 = ₹ 1500$$

13. X and Y enter into a partnership with their capitals in the ratio 7 : 9. At the end of 8th month, X withdraws his capital. If they receive the profits in the ratio 8 : 9, Find how long Y's capital was used.

(a) 4 months (b) 6 months

(c) 7 months (d) 8 months

Sol. (c) Let the Y's capital was used for T months.

According to the question,

$$\frac{7 \times 8}{9 \times T} = \frac{8}{9}$$

$$T = 7 \text{ months}$$

Hence capital of Y was used for 7 months.

14. The investments made by X and Y are in the ratio 3 : 2. If 5% of total profit is donated and A gets ₹ 8,550 as his share of profit then what is the amount of total profit.

(a) ₹ 14000 (b) ₹ 15,000

(c) ₹ 11,050 (d) ₹ 12,020



Sol. (b) Let the total profit = 100 units
Remaining profit after donation

$$= 100 - \frac{100 \times 5}{100} = 95 \text{ units}$$

$$\therefore \text{share of X} = \frac{95}{(3+2)} \times 3 = 57 \text{ units}$$

According to the question,
57 units = ₹ 8550

$$1 \text{ unit} = \frac{8550}{57}$$

$$100 \text{ units} = \frac{8550}{57} \times 100 = \text{₹}15000$$

Alternate : X : Y
3 : 2

$$3 \text{ units} = \text{₹} 8550$$

$$1 \text{ unit} = \text{₹} \frac{8550}{3} = \text{₹} 2850$$

$$5 \text{ units} = 2850 \times 5 = \text{₹} 14250$$

Note : 5 % of total profit is donated

$$\therefore 95 \% \text{ of total profit} = \text{₹} 14250$$

$$1 \% \text{ of total profit} = \text{₹} \frac{14250}{95}$$

100 % of total profit

$$= \text{₹} \frac{14250}{95} \times 100 = \text{₹} 15,000$$

15. Rakesh Yadav and Bhuvnesh are two partners in a firm sharing the profit in the ratio 4 : 5. If the firm earns a profit of ₹14,130, then profit to be received by Bhuvnesh

- (a) ₹6,280 (b) ₹7,850
(c) ₹1,570 (d) ₹3,140

Sol. (b)

$$\text{Rakesh Yadav : Bhuvnesh} \\ 4 : 5$$

According to the question,

$$(4+5) \text{ units} = \text{₹}14,130$$

$$1 \text{ unit} = \text{₹} \frac{14,130}{9} = \text{₹}1570$$

$$5 \text{ units} = 5 \times 1570 = \text{₹}7850$$

$\therefore$ Hence the share of Bhuvnesh = **₹7850**

16. A and B take a grass ground on lease for ₹ 300 for grazing their animals. If A grazes 10 animals for 5 weeks and B grazes 15 animals for 7 weeks. The ratio in which they should divide the rent is:

- (a) 1 : 2 (b) 10 : 21
(c) 11 : 20 (d) 2 : 1

Sol. (b) Total Rent = ₹300

	X	Y
No. of Animals	10	15
Time (in weeks)	5	7
Ratio of Rent	$\frac{50}{10}$	$\frac{105}{21}$

17. A started a business by investing some money and B invested 5000 more than A. A remained in business for 5 months and B remained in business for one month more than A. out of the total profit of 26000, B got 6000 more than A. Find the capitals invested by A and B.

- (a) ₹29,000, ₹18,000
(b) ₹25,000, ₹30,000
(c) ₹15,000, ₹10,000
(d) ₹15,000, ₹20,000

Sol. (d) Let amount invested by A = ₹ x

$$\begin{array}{ccc} & A & B \\ \text{Capital} \rightarrow & x & : (x + 5000) \end{array}$$

According to the question,

Share of A in profit

$$= \frac{(26000 - 6000)}{2} = \text{₹}10,000$$

Share of B in profit

$$= (26000 - 10000) = \text{₹} 16,000$$

By using formulae:

$$\frac{C_1 \times T_1}{C_2 \times T_2} = \frac{P_1}{P_2}$$

$$\frac{x \times 5}{(x + 5000) \times 6} = \frac{10,000}{16,000}$$

$$4x = 3x + 15000$$

$$x = \text{₹} 15000$$

Required capital of A = ₹ 15,000

Required capital of B

$$= (15,000 + 5000) = \text{₹} 20,000$$

18. A and B started a business in partnership by investing Rs.10,000 and Rs. 4000 respectively. condition of partnership is that B got Rs.100 per month for management of the business. After paying 5% interest on the capital, annual profit has been distributed in the ratio of their investments. Find the share of their profit, if the annual profit is Rs. 4000.

(a) ₹3000 each (b) ₹ 2500 each

(c) ₹1500 each (d) ₹2000 each

Sol. (d) B's profit share in 1 year = 12 × 100 = Rs. 1200

Interest of A

$$= \frac{10,000 \times 5 \times 1}{100} = \text{Rs. } 500$$

$$\text{Interest of B} = \frac{4000 \times 5 \times 1}{100}$$

$$= \text{Rs. } 200$$

Total profit of A and B

$$= (1200 + 500 + 200) = \text{Rs. } 1900$$

Remaining profit

$$= (4000 - 1900) = \text{Rs. } 2100$$

Note: Remaining profit will be divide in the ratio of their profit.

$$A : B$$

$$\text{Capital} = 10,000 : 4000$$

$$5 : 2$$

Share of A in remaining profit

$$= \frac{2100}{(5+2)} \times 5 = \text{Rs. } 1500$$

Share of B in Remaining profit

$$= \frac{2100}{(5+2)} \times 2 = \text{Rs. } 600$$

$$\text{Total profit of A} = 500 + 1500 \\ = \text{Rs. } 2000$$

$$\text{Total profit of B} = 1200 + 600 + 200 = \text{Rs. } 2000$$

19. A starts a business with Rs.1000 B joins him after 6 months with Rs. 4000. C puts a sum of Rs. 5000 for 4 months only. At the end of the year the business gave a profit of Rs. 2800. How should the profit be divided among them?

(a) Rs. 600, Rs. 1200, Rs. 1000

(b) Rs. 800, Rs. 600, Rs. 1400



(c) Rs. 1000, Rs. 1200, Rs. 600

(d) Rs. 1200, Rs. 600, Rs. 1000

Sol. (a) According to the question,

$$\begin{array}{ccc} \text{A} & \text{B} & \text{C} \\ \text{invest.} \rightarrow & 1000 \times 12 & : 4000 \times 6 & : 5000 \times 4 \\ & 3 : 6 : 5 & = 14 \text{ units} = 2800 \\ & & 1 \text{ unit} = 200 \end{array}$$

Profit of A = 3×200 = Rs. 600Profit of B = 6×200 = Rs. 1200Profit of C = 5×200 = Rs. 1000

20. A and B enter into a partnership for a year. A contributes Rs. 3000 and B Rs. 4000. After 4 months they admit C, who contributes Rs. 4500. If B withdraws his contribution after 6 months, how would they share a profit of Rs. 1000 at the end of the year?

(a) Rs. 250, Rs. 200, Rs. 550

(b) Rs. 150, Rs. 200, Rs. 650

(c) Rs. 375, Rs. 250, Rs. 375

(d) Data inadequate

$$\begin{array}{ccc} \text{Sol. (c)} & \text{A} & : \text{B} & : \text{C} \\ \text{Invest.} & 3000 & : & 4000 & : & 4500 \\ \text{Time} & 12 & : & 6 & : & 8 \\ \text{Profit} & 3000 \times 12 & : & 4000 \times 6 & : & 4500 \times 8 \\ & 3 & : & 2 & : & 3 \\ & 8 \text{ units} & = & 1000 \end{array}$$

$$1 \text{ unit} = \frac{1000}{8} = 125$$

Profit of A = 3×125 = 375Profit of B = 2×125 = 250Profit of C = 3×125 = 375

21. A, B and C enter into a partnership. A contributes one-third of the capital for one-third of the time. B contributes one-sixth of the capital for one-third of the time. C contributes the remaining capital for the whole time. How should they divide a profit of Rs. 1200.

(a) Rs. 300, Rs. 200, Rs. 700

(b) Rs. 200, Rs. 100, Rs. 900

(c) Rs. 375, Rs. 250, Rs. 575

(d) Rs. 385, Rs. 255, Rs. 475

$$\begin{array}{ccc} \text{Sol. (b)} & \text{A} & \text{B} & \text{C} \\ \text{Invest} \rightarrow & \frac{1}{3} & : & \frac{1}{6} : \left[1 - \left(\frac{1}{3} + \frac{1}{6} \right) \right] = \frac{1}{2} \\ \text{Time} \rightarrow & \frac{1}{3} & : & \frac{1}{3} : 1 \\ \text{Profit} \rightarrow & \frac{1}{3} \times \frac{1}{3} & : & \frac{1}{3} \times \frac{1}{3} : \frac{1}{2} \times 1 \\ & \frac{1}{9} & : & \frac{1}{18} : \frac{1}{2} \\ & 2 & : & 1 : 9 = 12 \end{array}$$

$$\therefore 12 \text{ Units} = 1200$$

$$\therefore 1 \text{ Unit} = 100$$

Profit of A = 2×100 = Rs. 200Profit of B = 1×100 = Rs. 100Profit of C = 9×100 = Rs. 900

22. Manoj got Rs. 6000 as his share out of the total profit of Rs. 9000 which he and Ramesh earned at the end of one year. If Manoj invested Rs. 20,000 for 6 months, where as Ramesh invested his amount for the whole year, the amount invested by Ramesh was

(a) Rs. 60,000 (b) Rs. 10,000

(c) Rs. 40,000 (d) Rs. 5000

$$\begin{array}{ccc} \text{Sol. (d)} & \text{M} & : \text{R} \\ \text{Profit} \rightarrow & 6000 & : 3000 \\ & 2 & : 1 \\ \text{Time} \rightarrow & 6 & : 12 \\ \text{Invest.} \rightarrow & \frac{2}{6} & : \frac{1}{12} \\ & 4 & : 1 \end{array}$$

$$4 \text{ units} \rightarrow 20000$$

$$1 \text{ unit} = 5000$$

Ramesh's invested
= 1×5000 = Rs. 5000

23. A and B enter into partnership investing Rs. 12000 and Rs. 16000 respectively. After 8 months, C also joins the business with a capital of Rs. 15000. The share of C in a profit of Rs. 45,600 after 2 years will be

(a) Rs. 12000 (b) Rs. 14,400

(c) Rs. 19,200 (d) Rs. 21,200

Sol. (a)

$$\begin{array}{ccc} & \text{A} & : \text{B} & : \text{C} \\ \text{Invest.} & 12000 \times 24 & : & 16000 \times 24 : 15000 \times 16 \\ \text{Profit} & 6 & : & 8 : 5 \end{array}$$

$$19 \text{ units} \rightarrow 45600$$

$$1 \text{ unit} \rightarrow = 2400$$

$$\text{C's Amount} = 5 \times 2400$$

$$= \text{Rs. } 12000$$

24. A started a business by investing Rs. 2700. After sometime B joined him by investing Rs. 2025. At the end of one year, the profit was divided in the ratio 2 : 1. After how many months did B join the business?

(a) 4 Months (b) 6 Months

(c) 3 Months (d) 2 Months

Sol. (a) According to the question,

$$\begin{array}{ccc} & \text{A} & : \text{B} \\ \text{Invest.} & 2700 \times 12 & : 2025 \times T \\ \text{Profit} & 2 & : 1 \\ & 2700 \times 6 & : 2025 \times T \end{array}$$

$$T = \frac{2700 \times 6}{2025}$$

$$T = 8 \text{ months}$$

Hence B joins after 4 months

25. A, B and C invested in the ratio 1 : 2 : 3; the timing of their investments being in the ratio 1 : 2 : 3. In what ratio would their profit be distributed?

(a) 3 : 2 : 1 (b) 1 : 2 : 3

(c) 1 : 4 : 9 (d) 9 : 4 : 1

$$\begin{array}{ccc} \text{Sol. (c)} & \text{A} & : \text{B} & : \text{C} \\ \text{Invest.} & 1 & : & 2 & : & 3 \\ \text{Time.} & 1 & : & 2 & : & 3 \\ \text{Profit} & 1 & : & 4 & : & 9 \end{array}$$

26. A, B and C invested in the ratio 2 : 5 : 7; the timing of their investments being in the ratio 3 : 4 : 5. In what ratio would their profit be distributed?

(a) 2 : 10 : 15 (b) 15 : 10 : 2

(c) 6 : 20 : 35 (d) 6 : 20 : 15

$$\begin{array}{ccc} \text{Sol. (c)} & \text{A} & : \text{B} & : \text{C} \\ \text{Invest.} & 2 & : & 5 & : & 7 \\ \text{Time.} & 3 & : & 4 & : & 5 \\ \text{Profit} & 6 & : & 20 & : & 35 \end{array}$$

27. A, B and C invested capital in the ratio 4 : 6 : 9. At the end of the business term, they received the profits in the ratio 2 : 3 : 5. Find the ratio of time for which they contributed their capitals.

(a) 6 : 5 : 8 (b) 6 : 5 : 9

(c) 10 : 12 : 9 (d) 18 : 18 : 20



Sol. (d)	A	:	B	:	C
Invest	4	:	6	:	9
Profit	2	:	3	:	5
Time	$\frac{2}{4}$	:	$\frac{3}{6}$	:	$\frac{5}{9}$
	$\frac{1}{2}$	:	$\frac{1}{2}$	:	$\frac{5}{9}$

$$\frac{1}{2} \times 18 : \frac{1}{2} \times 18 : \frac{5}{9} \times 18$$

(LCM 2, 2, 9 = 18)

$$9 : 9 : 10$$

$$\text{so, } 18 : 18 : 20$$

28. A, B and C invest their capitals in a business. If the ratio of their periods of investments are 2 : 3 : 6 and their profits are in the ratio of 4 : 5 : 6. Find the ratio in which the investments are made by A, B and C.

(a) 9 : 10 : 12 (b) 4 : 5 : 6

(c) 8 : 5 : 12 (d) 6 : 5 : 3

Sol.(d)	A	:	B	:	C
Time	2	:	3	:	6
Profit	4	:	5	:	6

$$\text{Invest. } \frac{4}{2} : \frac{5}{3} : \frac{6}{6}$$

$$\Rightarrow 6 : 5 : 3$$

29. A, B and C are partners, A receives $\frac{2}{7}$ of the profit and B and C share the remaining profit equally. A's income is increased by Rs. 240 when the profit rises from 10% to 15%. Find the capitals invested by B and C each.

(a) Rs. 2400 (b) Rs. 1200

(c) Rs. 4800 (d) Rs. 6000

Sol. (d) According to the question,

A	:	B	:	C
---	---	---	---	---

Profit	2	:	2.5	:	2.5
--------	---	---	-----	---	-----

$$15\% - 10\% = 5\%$$

$$\therefore 5\% = 240$$

$$\therefore 1\% = \frac{240}{5}$$

$$\therefore 100\% = \frac{240 \times 100}{5} = \text{Rs. } 4800$$

$$2 \text{ units} = 4800$$

$$1 \text{ unit} = 2400$$

$$\text{B's Amount} = 2.5 \times 2400 = \text{₹ } 6000$$

30. A, B and C are partners. A receives $\frac{5}{8}$ of the profit and B and C share the remaining profit equally. A's income is increased by Rs. 450 when the profit rises from 4% to 9%. Find the capitals invested by B and C each.

(a) Rs. 3366 (b) Rs. 1687.5

(c) Rs. 3475 (d) Rs. 2700

Sol. (d) According to the questions,

A	:	B	:	C
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$$5 : 1.5 : 1.5$$

$$9\% - 4\% = 5\%$$

$$\therefore 5\% = 450$$

$$\therefore 1\% = 90$$

$$\therefore 100\% = 9000$$

$$5 \text{ units} = 9000$$

$$1 \text{ unit} = 1800$$

$$\text{B's amount} = 1.5 \times 1800$$

$$= \text{Rs. } 2700$$

$$\therefore \text{C's amount} = 2700$$

31. Two partners invest Rs. 26000 and Rs. 16250 respectively in a business and agree that 40% of the profit should be divided equally between them and the remaining profit is to be treated as interest on capital. If one partner gets Rs. 450 more than the other, find the total profit made in the business.

(a) Rs. 3250 (b) Rs. 3520

(c) Rs. 3230 (d) Rs. 3200

Sol. (a)

A	:	B
26000	:	16250

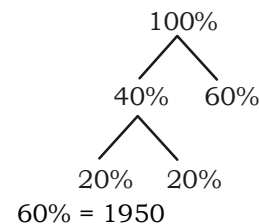
invest/profit	8	:	5
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$$3 \text{ units} = 450$$

$$1 \text{ unit} = 150$$

$$8 + 5 = 13 \text{ units}$$

$$13 \times 150 = 1950$$



$$60\% = 1950$$

$$100\% = \text{Rs. } 3250$$

32. Two partners invest Rs. 17000 and Rs. 13000 respectively in a business and agree that 75% of the profit should be divided equally between them and the remaining profit is to be treated as interest on capital. If one partner gets Rs. 532 more than the other, find the total profit made in the business.

(a) Rs. 16960 (b) Rs. 14960

(c) Rs. 16950 (d) Rs. 15960

Sol. (d)

A	:	B	
Invest/profit	17000	:	13000

$$\frac{17}{4} - \frac{13}{4}$$

$$4 \text{ units} = 532$$

$$1 \text{ unit} = \frac{532}{4} = 133$$

$$\text{Total } 30 \text{ units} = 30 \times 133 = 3990$$

$$25\% = 3990$$

$$100\% = \frac{3990 \times 100}{25} = \text{Rs. } 15960$$

33. A and B invested in the ratio 5 : 3 in a business. If 10% of the total profit goes to charity and A's share is Rs. 900, find the total profit.

(a) Rs. 1600 (b) Rs. 1400

(c) Rs. 1500 (d) Rs. 1800

Sol. (a)

A	:	B	
Invest.	5	:	3

$$5 \text{ units} = 900$$

$$1 \text{ unit} = 180$$

$$\text{Total Profit} = 8 \text{ units}$$

$$\Rightarrow 8 \times 180 = 1440$$

$$90\% = \text{Rs. } 1440$$

$$100\% = \frac{1440 \times 100}{90} = \text{Rs. } 1600$$



34. A and B invested in the ratio 4 : 9 in a business. If 8% of the total profit goes to charity and A's share is Rs. 460, find the total profit.

(a) Rs. 2625 (b) Rs. 2526
(c) Rs. 1526 (d) Rs. 1625

Sol.(d) A : B

Invest. 4 : 9

4 units → 460

1 unit = 115

Total profit = 13 unit = 13×115
= Rs. 1495

92% = 1495

$$100\% = \frac{1495 \times 100}{92}$$

$$= \text{Rs. } 1625$$

35. A puts Rs. 768 more in a business than B, but B has invested his capital for 7 months while A has invested his for 4 months. If the share of A is Rs. 42 more than that of B out of the total profits of Rs. 358, find the capital contributed by B ?

(a) Rs. 642 (b) Rs. 1400

(c) Rs. 632 (d) Rs. 462

Sol. (c) A : B

Time 4 : 7

Profit 200 : 158

Let Profit of B = x

$$\therefore x + 42 + x = 358$$

$$x = 158$$

$$\text{Invest} \rightarrow \frac{200}{4} : \frac{158}{7}$$

$$1400 : 632$$

768 Units

$$\therefore 768 \text{ units} - 768$$

$$\therefore 1 \text{ unit} = 1$$

$$\therefore \text{B invest.} = \text{Rs. } 632$$



36. A and B invest Rs. 3000 and Rs. 4000 in a business. A receives Rs. 10 per month out of the profit as a remuneration for running the business and the rest of profit is divided in proportion to the investments. If in a year 'A' totally receives Rs. 390, what does B receive?

(a) Rs. 630 (b) Rs. 360

(c) Rs. 480 (d) Rs. 38

Sol.(b) According to the question,

A : B

Invest. 3000 : 4000

3 : 4

$$A = 10 \times 12 = \text{Rs. } 120$$

(As remuneration)

$$\text{Investment of A} = 390 - 120$$

$$= \text{Rs. } 270$$

$$3 \text{ Units} = 270$$

$$\therefore 1 \text{ Unit} = 90$$

$$\therefore 4 \text{ Units} = 360$$

$$\text{Profit of B} = \text{Rs. } 360$$



Exercise

1. A started a business with ₹ 45,000 and B joined afterwards with 30,000. If the profit at the end of the one year was divided in the ratio 2 : 1 respectively, then B would have joined A for business after.
 - (a) 1 month (b) 2 months
 - (c) 3 months (d) 4 months
2. Four milkmen rented a pasture. M puts to graze 16 cows for 3 months and N puts 20 cows for 4 months, O puts 18 cows for 6 months and P puts 42 cows for 2 months. If M's share in rent be ₹ 2400, the rent paid by O is.
 - (a) ₹ 3200 (b) ₹ 4200
 - (c) ₹ 4000 (d) ₹ 5400
3. Two partners X and Y start a business by investing ₹ 50,000 and ₹ 40,000 respectively. What will be the ratio of their profits at the end of the year?
 - (a) 5 : 4 (b) 3 : 6
 - (c) 4 : 5 (d) 6 : 3
4. X starts a business with ₹ 25,000. After 4 months Y joins him with ₹ 20,000. What will be the ratio of their profit at the end of the year.
 - (a) 4 : 8 (b) 5 : 10
 - (c) 15 : 8 (d) 9 : 18
5. A starts a business with 21,000/- and later on B joins him with 36,000/- After how many months did B join if the profit is distributed in equal ratio?
 - (a) 5 (b) 7
 - (c) 6 (d) 9
6. Rakesh yadav and Bhuvnesh started a business by investing amount of ₹ 1,85,000 and ₹ 2,25,000 respectively. if Bhuvnesh's share in the profit earned by them is ₹ 9,000 then what is the total profit earned by them together?
 - (a) ₹ 17,400 (b) ₹ 16,400
 - (c) ₹ 16,800 (d) ₹ 17,800
7. A and B started a boutique investing amounts of ₹ 35,000 and ₹ 56,000 respectively. If A's share in the profit earned by them is ₹ 45,000, then what is the total profit earned?
 - (a) ₹ 81,000 (b) ₹ 1,27,000
 - (c) ₹ 72,000 (d) ₹ 1,17,000
8. Rakesh Yadav and Bhuvnesh invested amounts of ₹ 40,000 and ₹ 75,000 respectively. At the end of five years they got a total dividend of ₹ 46,000. what is Rakesh Yadav's share in the dividend?
 - (a) ₹ 16,500 (b) ₹ 15,500
 - (c) ₹ 15,000 (d) ₹ 16,000
9. Rakesh Yadav invested an amount of ₹ 25,000 and started a business. Bhuvnesh joined him after one year with an amount of ₹ 30,000. After two years from starting the business, they earned the profit of ₹ 46,000. What will be Bhuvnesh's share in the profit?
 - (a) ₹ 14,000 (b) ₹ 12,000
 - (c) ₹ 17,250 (d) ₹ 20,000
10. Mr. Rakesh Yadav opened a workshop investing ₹ 40,000. He invested additional amount of ₹ 10,000 every year. After two years his Student Bhuvnesh joined him with an amount of ₹ 85,000. Thereafter Bhuvnesh did not invest any additional amount. On completion of four year from the opening of workshop they earned an amount of ₹ 1,95,000. What will be Rakesh Yadav's share in the earning.
 - (a) 85,000 (b) 1,10,000
 - (c) 1,35,000 (d) 95,000
11. X and Y enter into a partnership with capitals in the ratio 5 : 6 and at the end of 8 months, X withdraws. If they receive the profit in the ratio 5 : 9, Find how long Y's capital was used.
 - (a) 8 months (b) 9 months
 - (c) 11 months (d) 12 months
12. Two partners invest ₹ 125,000 and ₹ 85000 respectively in a business and agree that 60% of the profit should be divided equally between them and the remaining profit is to be divided into ratio of their capitals. If one partner gets ₹ 300 more than the other, Find the total profit made in the business.
 - (a) ₹ 3739.50 (b) ₹ 3937.50
 - (c) ₹ 3749.50 (d) ₹ 3947.50
13. Two brothers invested ₹ 50,000 and ₹ 70,000 respectively in a business and agreed that 70% of the profit should be divided equally between them and the remaining profit in the ratio of investment. If one Brother gets ₹ 90 more than the other, Find the total profit made in the business.
 - (a) ₹ 1200 (b) ₹ 1400
 - (c) ₹ 1600 (d) ₹ 1800
14. A, B and C enter into a partnership with capitals in the ratio 5 : 6 : 8, At the end of the business term, they received the profit in the ratio 5 : 3 : 12. Find the ratio of time for which they contributed their capitals?
 - (a) 2 : 1 : 3 (b) 1 : 2 : 3
 - (c) 2 : 3 : 1 (d) 3 : 2 : 1
15. X and Y entered into a partnership, investing ₹ 16,000 and ₹ 12,000 respectively. After 3 months X withdrew ₹ 5000, while Y invested 5000 more. After 3 months more Z joins the business with a capital of ₹ 21,000. After a year they obtained a profit of ₹ 26,400. By what amount does the share of Y exceeds the share of Z.
 - (a) ₹ 3600 (b) ₹ 3800
 - (c) ₹ 4600 (d) ₹ 4800



16. X, Y and Z are partner in a business. If X's capital is twice of Y's capital and Y's capital is three times to that of Z's capital then find the ratio of their investments.
(a) 6 : 3 : 1 (b) 3 : 8 : 1
(c) 4 : 9 : 3 (d) 3 : 1 : 5
17. X and Z invest capital in the ratio 2 : 1 while X and Y invest capital in the ratio 3 : 2. If their annual profit is ₹ 1,57,300 then what is Y's share?
(a) ₹ 48,400 (b) ₹ 58,809
(c) ₹ 48,810 (d) ₹ 47,782
18. X, Y and Z enter into a partnership. X invests $\frac{1}{4}$ part of total capital for one-fourth of the time. Y contributes one fifth of the capital for half of the time. Z contributes the remaining capital for the whole time. How should they share a profit of ₹ 1140?
(a) ₹ 100, ₹ 160, ₹ 880
(b) ₹ 110, ₹ 140, ₹ 860
(c) ₹ 120, ₹ 150, ₹ 840
(d) ₹ 140, ₹ 170, ₹ 830
19. A, B and C are three partners in a business. A, whose money has been used for 4 months, claims $\frac{1}{8}$ of the profit, B whose money has been used for 6 months, claims $\frac{1}{3}$ of the profit. C has invested ₹ 1560 for 8 months. How much money did A and B contribute?
(a) ₹ 740, ₹ 1250
(b) ₹ 730, ₹ 1240
(c) ₹ 720, ₹ 1280
(d) ₹ 750, ₹ 1260
20. In a partnership X invests $\frac{1}{6}$ th of the capital for $\frac{1}{6}$ th of the time, Y invests $\frac{1}{3}$ rd of the capital for $\frac{1}{3}$ rd time and Z invests the remaining capital for the whole time. If at the end of the year the profit earned is ₹ 23,000 then what will be Y's share?
(a) ₹ 5500 (b) ₹ 5000
(c) ₹ 6000 (d) ₹ 4000
21. Rakesh and Bhuvnesh started a business investing amounts in the ratio of 2 : 3. If Rakesh Yadav has an additional amount of ₹10,000, their ratio of investment would have been 3 : 2, The amount invested by Rakesh Yadav was :
(a) ₹8,000 (b) ₹12,000
(c) ₹18,000 (d) ₹20,000
22. The ratio of investments of two partners X and Y is 11 : 12 and the ratio of their profit is 2 : 3. If X invested the money for 8 months, then the time for which Y invested the money is:
(a) 8 months (b) 9 months
(c) 10 months (d) 11 months
23. Bhuvnesh, Rakesh and Pawan started a business with ₹47,000. Bhuvnesh puts in ₹5,000 more than Rakesh and Rakesh ₹3,000 more than Pawan. The share of Bhuvnesh out of the profit of ₹14,100 will be:
(a) ₹3,600 (b) ₹4,500
(c) ₹6,000 (d) ₹6,300
24. Bhuvnesh and Ankur enter into a partnership. At the end of 9 months Ankur withdraws but Bhuvnesh's capitals is used for one month more. If they receive profit in the ratio 5 : 6, then the ratio of their capital is:
(a) 3 : 4 (b) 4 : 3
(c) 5 : 6 (d) 6 : 5
25. Manoj, Pradeep and Chetan hired a car for ₹4,160. Manoj used it for 7 hours. Pradeep for 8 hours and Chetan used it for 11 hours. The rent shared by Manoj will be :
(a) ₹960 (b) ₹1120
(c) ₹1,260 (d) ₹1,760
26. Pradeep, Rakesh and Bhuvnesh are three partners in a business. The profit share of Pradeep is $\frac{3}{16}$ of the profit and Rakesh's share is $\frac{1}{4}$ of the profit. If Bhuvnesh receives ₹243, then the amount received by Rakesh will be :
(a) ₹90 (b) ₹96
(c) ₹108 (d) ₹120
27. Ankur is a working partner and Chetan is a sleeping partner in business. Ankur puts in ₹5,000 and Chetan puts in ₹6,000. Ankur received 15% of the profit for managing the business and the rest is divided in proportion to their capitals. The amount received by Ankur out of the profit of ₹880 in all is :
(a) ₹132 (b) ₹340
(c) ₹472 (d) ₹492
28. Bhuvnesh starts business with a capital of ₹14,000, five months later Rakesh joins and further two months later Seemant joins them. If the profit sharing ratio in the end of year is 4 : 3 : 2, then the money invested by Seemant was:
(a) ₹18,000 (b) ₹16,800
(c) ₹18,600 (d) ₹10,800
29. Rakesh, Manoj and Ankur become partners in a business. Rakesh contributes $\frac{1}{3}$ rd of the capital for $\frac{1}{4}$ th of the time. Manoj contributes $\frac{1}{5}$ th of the capital for $\frac{1}{6}$ th of the time and Ankur, contributes the rest of the capital for the whole time. If the profit is ₹1,820, then the Rakesh's share in profit is :



- (a) ₹130 (b) ₹260
(c) ₹292 (d) ₹304
30. In a business A and B gained some amount in a certain ratio. B and C received the profit in the ratio as that of A and B. If A received ₹6,400 and C received ₹10,000. Find the share of B
(a) ₹2,000 (b) ₹4,000
(c) ₹8,000 (d) ₹10,000
31. The capital of A and B are ₹20,000 and ₹4,000 respectively. A is entitled to be paid a salary of ₹1,200 per annum being a working partner. If the gross profit for one year is ₹1,800, their shares in the profit are respectively :
(a) ₹500, ₹100
(b) ₹1200, ₹600
(c) ₹1,700, ₹1,300
(d) ₹1,700, ₹100
32. A and B are partners who share profit in the ratio of 3 : 2, They agree to take C into partnership of $\frac{1}{4}$ th share of profit. The new profit sharing ratio will be:
(a) 9 : 6 : 5 (b) 5 : 6 : 9
(c) 6 : 5 : 9 (d) 9 : 5 : 6
33. A and B share profits and losses in a firm in the ratio of 3 : 2. C entered in this firm as a new partner and his profit sharing ratio is $\frac{1}{4}$ of total profit. If C has taken his share of profit from A and B in equal ratio, then the new profit sharing ratio will be :
(a) 19 : 11 : 1 (b) 19 : 11 : 10
(c) 10 : 11 : 9 (d) 10 : 11 : 19
34. A, B and C share the profit in the ratio of 2 : 3 : 7. If the average gain is ₹8,000, then B's share is:
(a) ₹2,000 (b) ₹1,000
(c) ₹1,500 (d) ₹6000
35. A, B and C share profit in the ratio of $\frac{1}{4} : \frac{1}{6} : \frac{7}{12}$. If C retires, they divided the share of the profit of C in the ratio of 4 : 5 respectively. The new profit sharing ratio of A and B will be :
(a) 55 : 53 (b) 53 : 55
(c) 5 : 3 (d) 3 : 5
36. A, B and C enter into a partnership. A puts in ₹1200 for 6 months, B ₹800 for 7 months and C ₹600 for 8 months. The share of A out of a profit of ₹396 is:
(a) ₹162 (b) ₹62
(c) ₹108 (d) ₹18
37. A and B enter into a partnership investing ₹48,000 and ₹60,000 respectively. After 3 months, A withdraws ₹8,000 while B invests ₹6,000 after 6 months of starting the business. Out of the total amount of profit, if A gets ₹12,000 as his share at the end of the year. Total profit is:
(a) ₹24,000 (b) ₹30,000
(c) ₹36,000 (d) ₹37,000
38. M, P and Q together started a business. M invested ₹6,500 for 6 months, P invested ₹8,400 for 5 months and Q invested ₹10,000 for 3 months. M is working member for which he gets 5% of total profit extra. If the total gain is ₹7,400, then Q's share is :
(a) ₹1900
(b) ₹2,100
(c) ₹3,200
(d) Data are incomplete
39. A, B and C jointly start a business A puts in ₹15,000 for 8 months, B puts in ₹12,000 for 9 months and C puts in ₹8,000, for the whole year. At the end of the year there is a profit of ₹10,800. The difference between A's share and C's share in the profit will be :
(a) ₹800 (b) ₹600
(c) ₹1200 (d) ₹1,800
40. A started a business by investing ₹50,000. After 6 months B joined her by investing ₹75,000. After 6 months C joined with ₹1,25,000. What is the ratio of profit shared after 2 years among A, B and C ?
(a) 4 : 5 : 6 (b) 8 : 9 : 10
(c) 8 : 9 : 12 (d) 4 : 5 : 8
41. A starts a business with ₹45,000. After 6 months B enters in this business with ₹80,000. After one year C invests ₹1,20,000. In what ratio the profit will be divided among A, B and C after two years?
(a) 9 : 16 : 24 (b) 3 : 4 : 4
(c) 3 : 4 : 8 (d) 3 : 3 : 8
42. Three partners A, B and C started a business by investing. 48000 each. After 6 months, A left the business, after 10 months B left the business and after 12 months C left the business. If total earned profit is . 5250, then find the share of A, B and C?
(a) ₹1125, ₹1825, ₹2250
(b) ₹ 1125, ₹1800, ₹2200
(c) ₹1125, ₹1875, ₹2250
(d) ₹1175, ₹1256, ₹2350
43. Three partners started a business by investing Rs. 60,000, Rs. 80,000 and Rs. 1,20,000 respectively. First partner left the business after 4 months, second after 9 months and third remained in the business for the whole year. At the end of year the total profit earned is 1,60,480, then find their shares of profit.
(a) ₹ 16840, ₹44188, ₹ 92686
(b) ₹ 16048, ₹48144, ₹ 96288
(c) ₹ 16042, ₹14842, ₹ 9862
(d) ₹ 15000, ₹13423, ₹ 7562
44. A, B and C have invested a sum of 125000 in a business. B invested . 15000 more than A and C invested 20,000 more than B. If the total earned profit is 37450 at the end of year, then find their share of profit.



- (a) ₹ 7490, ₹ 11984, ₹ 17976
(b) ₹ 8480, ₹ 7550, ₹ 8560
(c) ₹ 7940, ₹ 7054, ₹ 17500
(d) ₹ 5100, ₹ 6943, ₹ 7140
45. Bhuvnesh started a business by investing 42000. After few months Rakesh Yadav joined by investing 49,000. If at the end of year Bhuvnesh got 9000 and Rakesh Yadav got 7000 as a share of their profit. Then after how many months Rakesh Yadav joined the business.
(a) 1 month (b) 4 months
(c) 2 months (d) 3 months
46. A, B and C invested money in the ratio of $\frac{1}{2} : \frac{1}{3} : \frac{1}{5}$ in a business. After 4 months A doubled his investment and after 6 months B, half his investment. If the total profit at the end of year be 34650 then find the share of each in profit.
(a) ₹20,000, ₹25,000, ₹18,000
(b) ₹15,500, ₹27,200, ₹20,450
(c) ₹22,500, ₹6750, ₹5400
(d) ₹10350, ₹21,540, ₹12,050
47. A and B started a business by investing 36000 and 45000 respectively. After 4 months B withdraws $\frac{4}{9}$ of his investment. its 5 months after she again invested $\frac{11}{9}$ of its original investment. If the total earned profit at the end of the year, is 117240, then who will get more money as a share of profit and how much?
(a) A, ₹15,500 (b) B, ₹12,450
(c) A, ₹14,245 (d) B, ₹13,560
48. A, B and C started a business by investing 24,000, 32000 and 18000 respectively. A and B are active partner and get 15% and 12% of total profit and remaining profit is to be distributed among them in the ratio of their investments. If C got total 65700 as a profit, what was the total amount of profit?
(a) ₹4,70,000 (b) ₹ 3,70,000
(c) ₹3,45,000 (d) ₹1,57,000
49. Katrina, Rakesh Yadav and Bhuvnesh hired a pasture. Katrina grazed 12 cows for 2 hours every day for 4 months, Rakesh Yadav grazed 16 cows for 4 hours every day for 6 months and Bhuvnesh grazed 6 cows for 9 hours everyday for 2 months. If Rakesh Yadav has paid 1152 as a share of fare. Find the amount of total Rent.
(a) ₹1413 (b) ₹1214
(c) ₹1764 (d) ₹1102
50. A started a business with a capital of 500. After 2 months B joined A with 400. 6 months after the business started C joined with 800. If the total profit earned at the end of the year is 444. Find the share of their profit.
(a) ₹ 180, ₹ 120, ₹ 144
(b) ₹ 150, ₹ 130, ₹ 123
(c) ₹ 160, ₹ 141, ₹ 125
(d) ₹ 141, ₹ 110, ₹ 140
51. A, B and C are partners in a business. A invested ₹ 4000 for whole year. B invested ₹ 6000 initially but increased this investment upto ₹ 8000 at the end of 4 months, while C invested 8000 initially, but withdraw 2000 at the end of 9 months, At the end of year total earned profit is 16950, find their share of profit.
(a) ₹ 3600, ₹ 6600, ₹ 6750
(b) ₹ 2000, ₹ 3050, ₹ 5400
(c) ₹ 2450, ₹ 2460, ₹ 1456
(d) None of these
52. A, B and C started a business in partnership and invested in the ratio of $\frac{1}{4} : \frac{1}{3} : \frac{1}{6}$. After 4 months A withdraws half of his investment and after 2 months more B withdraws $\frac{1}{3}$ of its investment. If the total earned profit, at the end of year is 14000. Find the share of their profit.
(a) ₹ 2500, ₹ 2450, ₹ 2145
(b) ₹ 3000, ₹ 4500, ₹ 2100
(c) ₹ 4000, ₹ 3500, ₹ 1254
(d) ₹ 4200, ₹ 5600, ₹ 4200
53. Three partner A, B and C invested in the ratio $\frac{5}{4} : \frac{4}{5} : \frac{6}{5}$ in a business. After 3 months A increased his capital by 50%. If the total profit of ₹ 35,700 earned at the end of year, find what was the A's share in profit?
(a) ₹12,000 (b) ₹ 16,500
(c) ₹ 13,000 (d) ₹ 15,600
54. Out of total capital required to start a business A invested 30%, B invested $\frac{2}{5}$ th and C invested the remaining capital. At the end of one year sum of ₹ 4000 is earned as a profit which is 20% of the capital given by B, then find how much C invested in the business?
(a) ₹25000 (b) ₹10000
(c) ₹15000 (d) ₹12450
55. A and B started a business in partnership by investing in the ratio of 7 : 9. After 3 months A withdraws $\frac{2}{3}$ of its investment and after 4 months from the beginning B withdraws $33\frac{1}{3}\%$ of its investment. If a total earned profit is 10201 at the end of 9 months, find the share of each in the profit.
(a) ₹ 3535, ₹ 6666
(b) ₹ 3055, ₹ 5555
(c) ₹ 4503, ₹ 1345
(d) ₹ 3545, ₹ 3333



56. Three partners invested ₹ 42000, ₹ 48000 and ₹ 32000 respectively. Partnership condition is that, each will get interest on his capital at the rate of 7% annual and the remaining profit will be divided in the ratio of their capitals. If at the end of the year the total profit is ₹ 32940, then find the share of A in the profit.
- (a) ₹12960 (b) ₹11340
(c) ₹8640 (d) None of these
57. A and B invest 20,000 and 30,000. After 2 months A invests Rs. 20,000 more and B also invests 20,000 more. After one year the total profit was Rs. 75,000. Find the share of B :
- (a) 42000 (b) 43000
(c) 44000 (d) 45000
58. A invests $\frac{1}{6}$ th part of capital for $\frac{1}{6}$ th of time and B invests $\frac{1}{3}$ rd capital for $\frac{1}{3}$ rd time and C invest rest of the capital for full time. If they get Rs. 46,000 as total profit. Find the share of A :
- (a) 1500 (b) 2000
(c) 2200 (d) 3000
59. The ratio of capitals of A : B : C is 3 : 4 : 2 and the ratio of their profit is 1 : 2 : 3. Find the ratio of their time :
- (a) 2 : 3 : 9 (b) 3 : 2 : 9
(c) 4 : 5 : 6 (d) 9 : 2 : 3
60. A invests $\frac{5}{9}$ part of total capital for 6 months. B invest rest of the capital for some time. At the end of year B got $\frac{4}{7}$ part of total profit. Find the time for which B invested ?
- (a) 12 months (b) 10 months
(c) 14 months (d) 15 months
61. A and B started a business with A capital of Rs. 29X and Rs. 82,000. If A gets 20 % profit in salary & share of A is more than B. Had the entire profit being divided in the ratio they invested, B would have received Rs. 5200 more than A's share. If the earning of A & B are Rs. 16,800 & 11,200. Find X:
- (a) 2000 (b) 3000
(c) 4000 (d) 5000
62. A and B started a business with Rs. 3,50,000 and Rs. 1,40,000 respectively. A gets 20 % of profit for management and rest of the profit is divided in their capital ratio. If A gets Rs. 38000 more than B then find the total profit :
- (a) 20,000 (b) 50,000
(c) 70,000 (d) 65,000
63. A, B and C started a business with a capital of Rs. 8 lac, 12 lac & 15 lac. A is a working partner & got $\frac{1}{8}$ part in form of salary. If the total earning of A is Rs. 5200 then find the value of total profit.
- (a) 16,000 (b) 15,000
(c) 18,000 (d) 20,000
64. A and B started a business with a capital of Rs. 20,000 & Rs. 35000 respectively and decided to share their profit according to their capital. but C joined the business on the condition that they will share their profit equally in ratio (1 : 1 : 1) and for that C gives 2,20,000 to A & B. Then find the share of A that is given by C.
- (a) 20,000 (b) 15,000
(c) 30,000 (d) 40,000
65. A, B, C pasture in the same field. A has in it 10 oxen for 7 months, B has 12 oxen for 5 months and C has 15 oxen for 3 months. The rent is Rs 17.50. How much of the rent should each pay ?
- (a) Rs. 7, Rs. 6, Rs. 4.50
(b) Rs. 6, Rs. 8, Rs. 3.50
(c) Rs. 7, Rs. 5, Rs. 5.50
(d) Rs. 8, Rs. 5, Rs. 4.50
66. A and B entered into a partnership investing Rs. 16000 and Rs. 12000 respectively. After 3 months, A withdrew Rs. 5000 while B invested Rs. 5000 more. After 3 more months. C joins the business with a capital of Rs. 21000. The share of B exceeds that of C, out of a total profit of Rs. 26400 after one year, by
- (a) Rs. 1200 (b) Rs. 2400
(c) Rs. 3600 (d) Rs. 4800
67. Manoj got Rs. 6000 as his share out of the total profit of Rs. 9000 which he and Ramesh earned at the end of one year. If Manoj invested Rs. 20000 for 6 months, whereas Ramesh invested his amount for the whole year, the amount invested by Ramesh was:
- (a) Rs. 60000 (b) Rs. 10000
(c) Rs. 40000 (d) Rs. 5000
68. Kishan and Nandan started a joint firm. Kishan's investment was thrice the investment of Nandan and the period of his investment was two times the period of investment of Nandan. Nandan got Rs. 4000 as profit for his investment. Their total profit if the distribution of profit is directly proportional to the period and amount, is :
- (a) Rs. 24000 (b) Rs. 16000
(c) Rs. 28000 (d) Rs. 20000
69. A, B, C subscribe Rs. 50,000 for business. A subscribes 4,000 more than B and B subscribes Rs. 5,000 more than C. Out of total profit of Rs. 35,000 A receives:
- (a) Rs. 11,900 (b) Rs. 8,400
(c) Rs. 14,700 (d) Rs. 13,600
70. A and B enter into a partnership with Rs. 50,000 and Rs. 60,000 respectively. C joins them after x months contributing Rs. 70,000 and B leaves x months before the end of the year. If they share the profit in the ratio of 20 : 18 : 21, then find the value of x :
- (a) 9 (b) 3
(c) 6 (d) 8



71. A & B are two partners start a business by investing a capital of ₹ 25,000 and ₹ 35,000 and decide to share their profit according to their capital. Later C joins the business on a condition that they will distribute the profit equally (1:1:1) and for that C gives 2,20,000 to A & B. Find in which ratio A & B distribute that amount.
(a) 2 : 3 (b) 1 : 3
(c) 3 : 5 (d) 2 : 5
72. A & B start a business with ₹ 1500 and ₹ 2000 respectively. After 4 months C also joins the business with ₹ 2250. If B withdraw his capital after 9 months, then find the share of B in a total profit of ₹ 900.
(a) ₹ 200 (b) ₹ 250
(c) ₹ 300 (d) ₹ 400
73. A & B start a business with ₹ 50 and ₹ 45 respectively. After 4 months A withdraws half of his capital and B withdraws half capital after 6 months and C joins the business with a capital of ₹ 70 after 6 months. Find the profit sharing ratio.
(a) 18 : 19 : 20 (b) 19 : 20 : 21
(c) 80 : 81 : 82 (d) 80 : 81 : 84
74. A & B start a business with ₹ 16000 and 15000. After 3 months, A withdraws ₹ 5000 and B invests ₹ 5000 more. C joined the business with ₹. 21000 after 3 months. If the total profit is ₹ 24,900, then find the share of C.
(a) ₹ 5000 (b) ₹ 4000
(c) ₹ 6000 (d) ₹ 6300
75. A invests $\frac{1}{6}$ th part of total capital for $\frac{1}{6}$ th time. B invests $\frac{1}{3}$ rd part of total capital for $\frac{1}{3}$ rd time and C invests the rest capital for full time. If the total profit is ₹ 23000, then find the share of B.
(a) ₹ 4000 (b) ₹ 4500
(c) ₹ 5000 (d) ₹ 6000
76. A & B start a business, A invests $\frac{1}{4}$ capital for $\frac{1}{4}$ th time and B invests $\frac{1}{5}$ th capital for $\frac{1}{2}$ time and C invests the remaining capital for full time. How should they divide the profit of Rs. 1140?
(a) 5 : 8 : 21 (b) 5 : 7 : 13
(c) 5 : 8 : 44 (d) 5 : 8 : 21
77. A, B, C start a business by investing the capital in ratio 5 : 6 : 8. At the end of business they receive the profit in the ratio of 5 : 3 : 12. Find the ratio of time for which they contribute their capital.
(a) 2 : 1 : 5 (b) 3 : 1 : 7
(c) 2 : 1 : 3 (d) 5 : 2 : 7
78. A, B, C start a business, A invests money for 4 months & claims $\frac{1}{8}$ of the total profit & B invests money for 6 months & claim $\frac{1}{3}$ of the profit while C invests Rs. 1560 for 8 months. Find ratio of money invested.
(a) 18 : 32 : 35 (b) 18 : 35 : 39
(c) 18 : 32 : 39 (d) 32 : 35 : 39
79. A & B rent posture for 10 months. A puts 100 cows for 8 months. How many cows can B put for the remaining two months. If he pays $\frac{3}{2}$ as much as A pays?
(a) 300 (b) 400
(c) 500 (d) 600
80. A & B started a business with ₹ 50,000 & 20,000. A is working partner and takes 20% of the total profit as his salary and remaining profit is divided according to their capital. If in this process A received ₹ 38000 more than B. Find the amount of total profit.
(a) ₹ 70000 (b) ₹ 65000
(c) ₹ 50000 (d) ₹ 60000
81. A, B, C are three partners with capitals of ₹ 8,00,000, ₹ 12,00,000 and ₹ 15,00,000 and they decide to share their profit according to the ratio of their capital. But A is working partner and takes $12\frac{1}{2}\%$ of total profit as salary. If A receives ₹ 5200 from the business. Find the amount of total profit.
(a) ₹ 15000 (b) ₹ 16000
(c) ₹ 17000 (d) ₹ 18000
82. A & B are two partners with capitals ₹ 50,000 & ₹ 70,000 and agreed that 70% of the total profit should be divided equally among them and the remaining profit in the ratio of their capital. If one partner gets ₹ 90 more than other. find the total profit.
(a) ₹ 1500 (b) ₹ 1600
(c) ₹ 1800 (d) ₹ 1700
83. A & B invest their capital in the ratio 3 : 2. If 5% of the total profit is donated and the rest profit is divided in the ratio of their capital. A gets Rs. 8550 as his share of profit then what is the amount of total profit?
(a) ₹ 15000 (b) ₹ 14000
(c) ₹ 13000 (d) ₹ 16000
84. A puts ₹ 375 more in a business than B. A invest for 8 months while B for 4 months. If the share of A is 75 more than that of B out of total profit of ₹ 125. Find the capital invested by A.
(a) ₹ 650 (b) ₹ 450
(c) ₹ 750 (d) ₹ 350
85. A invests ₹ 768 more than B but B has invested his capital for 7 months and A for 4 months. If the share of A is 42 more than that of B out of the total profit of ₹ 358. Find the amount invested by B.
(a) ₹ 630 (b) ₹ 632
(c) ₹ 600 (d) ₹ 650
86. A, B and C are three partners. A received $\frac{5}{8}$ part of total profit & remaining profit received by B and C equally. A's income is increased by Rs. 450 when the profit rises from 4% to 9%. Find the capital invested by B & C each.



- (a) ₹ 2500 (b) ₹ 2700
(c) ₹ 2600 (d) ₹ 2200
87. A, B, C are three partners. A gets $\frac{2}{7}$ part of total profit. B & C share the remaining profit equally. A's income increases by ₹ 240 when profit rise from 10% to 15%. Find the capital invested by B & C.
(a) ₹ 6500
(b) ₹ 4000
(c) ₹ 6000
(d) ₹ 8000
88. A & B started a business with a capital of Rs. 32,000 & ₹ 56,000 and decide to share their profit according to their capital. But C join the business on a condition that they will share the profit equally & for that C gives 2,20,000 to A & B. Then find in what ratio A & B will distribute that amount.
(a) 1 : 10 (b) 3 : 20
(c) 3 : 20 (d) 10 : 20
89. In a partnership business, B's capital was half of A's. If after 8 months. B withdrew half of his capital and after 2 months more A withdrew $\frac{1}{4}$ th of his capital, then the profit ratio of A and B will be
(a) 5 : 2 (b) 10 : 23
(c) 2 : 5 (d) 23 : 10
90. A and B invest in the ratio 3 : 5. After 6 months, C joins the business investing an amount equal to B's. At the end of the year what will be the ratio of their profits?
(a) 6 : 10 : 5 (b) 3 : 5 : 2
(c) 8 : 10 : 5 (d) 3 : 5 : 5
91. A and B entered into a partnership investing ₹ 16000 and ₹ 12000 respectively. After 3 months A withdrew ₹ 5000 while B invested ₹ 5000 more. After 3 more months C joins the business with a capital of ₹ 21000. The share of B exceeds that of C, out of a total profit of ₹ 26400 after one year by
(a) ₹ 2400 (b) ₹ 1200
(c) ₹ 3600 (d) ₹ 4800



ANSWER KEY

1. (c)	11. (d)	21. (a)	31. (d)	41. (b)	51. (a)	61. (a)	71. (b)	81. (b)
2. (d)	12. (b)	22. (d)	32. (a)	42. (c)	52. (d)	62. (c)	72. (c)	82. (c)
3. (a)	13. (d)	23. (c)	33. (b)	43. (b)	53. (b)	63. (a)	73. (d)	83. (a)
4. (c)	14. (a)	24. (a)	34. (d)	44. (a)	54. (c)	64. (a)	74. (d)	84. (c)
5. (a)	15. (a)	25. (b)	35. (a)	45. (b)	55. (a)	65. (a)	75. (a)	85. (b)
6. (b)	16. (a)	26. (c)	36. (a)	46. (c)	56. (b)	66. (c)	76. (c)	86. (b)
7. (d)	17. (a)	27. (c)	37. (b)	47. (d)	57. (a)	67. (d)	77. (c)	87. (c)
8. (d)	18. (a)	28. (b)	38. (a)	48. (b)	58. (b)	68. (c)	78. (c)	88. (a)
9. (c)	19. (c)	29. (b)	39. (a)	49. (c)	59. (a)	69. (c)	79. (d)	89. (d)
10. (b)	20. (d)	30. (c)	40. (b)	50. (a)	60. (b)	70. (b)	80. (a)	90. (a)
								91. (c)

Solution

1. (c) Capital of A (i) ₹ 45,000

Capital of B (ii) ₹ 30,000

Ratio of $P_1 : P_2 = 2 : 1$

Now by using formula,

$$\frac{C_1 T_1}{C_2 T_2} = \frac{P_1}{P_2}$$

$$\frac{45000 \times 12}{30000 \times T_2} = \frac{2}{1}$$

$$T_2 = 9$$

Then B would join business after
(12 - 9) = **3 months**

2. (d)

M N O P

No. of cows → 16 20 18 42
Time → 3 4 6 2

Ratio of Rent → 48 : 80 : 108 : 84

12 : 20 : 27 : 21

According to the question,

12 units = ₹ 2400

$$1 \text{ unit} = ₹ \frac{2400}{12} = 200$$

27 units = ₹ 27 × 200 = ₹ **5400**

3. (a)

X : Y

Capital → 50,000 : 40,000

Time → 1 : 1

Profit → 50,000 : 40,000
5 : 4

Note : Always remember when time is same the profit will be divided in the ratio of their capitals.

4. (c) X : Y

capital → 25,000 : 20,000

5 : 4
Time → 12 : 8
Profit → 60 : 32
15 : 8

Hence, Required ratio = **15 : 8**

5. (a) Capital of A = ₹ 21,000

Capital of B = ₹ 36,000

By using formula,

$$\frac{C_1 \times T_1}{C_2 \times T_2} = \frac{P_1}{P_2}$$

$$\frac{21000 \times 12}{36000 \times T_2} = \frac{1}{1}$$

$$T_2 = 7 \text{ months}$$

∴ So B joined business after

(12 - 7) = 5 months.

6. (b)

Rakesh

Yadav Bhuvnesh

Capital → 1,85,000 : 2,25,000

Profit → 37 : 45
↓ × 200 ↓ × 200
7400 9000

∴ Total profit = (7400 + 9000)
= ₹ **16400**

7. (d)

A B

Capital → 35,000 : 56,000

Profit → 5 : 8
↓ × 9000 ↓ × 9000
45000 72,000

Total profit = (45000 + 72,000)
= ₹ **1,17,000**

8. (d)

Rakesh

Yadav : Bhuvnesh

40,000 : 75,000

8 : 15

Time → 5 : 5

Profit → 8 : 15

Note: If time is same then ratio of their profit will be divided in the ratio of their capital.

∴ (8 + 15) units = ₹ 46,000

23 units = ₹ 46,000

1 unit = ₹ 2,000

∴ Share of Rakesh Yadav is

8 units = 8 × 2,000 = ₹ **16,000**

9. (c)

Rakesh

Yadav : Bhuvnesh

Capital → 25,000 : 30,000
5 : 6

Time → 2 : 1

Profit → 10 : 6
5 : 3

According to the question,

(5 + 3) units = ₹ 46,000

8 units = ₹ 46,000

1 unit = ₹ $\frac{46,000}{8}$

3 units = ₹ $\frac{46,000}{8} \times 3$
= ₹ **17,250**

Hence share of Bhuvnesh

= ₹ **17,250**

10. (b) Total investment of Rakesh

Yadav in 4 years = 40,000 + 50,000 + 60,000 + 70,000

= ₹ 2,20,000

Total investment of Bhuvnesh in 2 years = 85,000 × 2 = 1,70,000

Rakesh

Yadav : Bhuvnesh

Capital → 22,0000 : 1,70,000

Profit → 22 : 17

According to the question,

(22 + 17) units = ₹ 1,95,000

39 units = ₹ 1,95,000

1 unit = ₹ $\frac{1,95,000}{39}$

22 units = ₹ $\frac{1,95,000}{39} \times 22$

= ₹ **1,10,000**

11. (d) Let the capitals of Y was used for T months

According to the question.

$$\frac{5 \times 8}{6 \times T} = \frac{5}{9}$$

⇒ T = **12 months**

Hence capital of Y was used for = 12 months.

12. (b)

1st partner 2nd partner
Capital → 125,000 : 85,000

25 : 17
8

According to the question,

Note : 60 % of profit should be divided equally between.

Them

8 units = ₹ 300

1 unit = ₹ $\frac{300}{8}$

42 units = ₹ $\frac{300}{8} \times 42$

∴ 40% of profit = ₹ $\frac{300}{8} \times 42$

Total profit = ₹ $\frac{300 \times 100}{8 \times 40} \times 42$
= ₹ **3937.50**

13. (d)

1st Brother : 2nd Brother

Capital → 50,000 : 70,000

5 : 7
+2

2 units = ₹ 90

1 unit = ₹ $\frac{90}{2}$ = ₹ 45

12 units = 45 × 12 = ₹ 540

According to the question,

Note : 70% of the profit should be divided equally.

It means 30% of profit = ₹ 540

1 % of profit = ₹ $\frac{540}{30}$

100% of profit

= ₹ $\frac{540}{30} \times 100$ = ₹ **1800**

14. (a) We know

Profit = Time × capital invested
Required ratio of time

= $\frac{5}{5} : \frac{3}{6} : \frac{12}{8}$

= 1 : $\frac{1}{2}$: $\frac{3}{2}$

= 2 : 1 : 3

15. (a) Total capital invested by X in a year = 16,000 × 3 + 11000 × 9
= ₹ 147,000

Total capital invested by Y in a year = 12000 × 3 + 17000 × 9
= ₹ 189,000

Money invested by Z = 21,000 × 6
= ₹ 126,000

X : Y : Z

Capital → 147 : 189 : 126

7 : 9 : 6

According to the question,

(7 + 9 + 6) units = ₹ 26,400

1 unit = ₹ $\frac{26,400}{22}$ = ₹ 1,200

Required difference = (9 - 6) × 1200 = ₹ **3600**

16. (a) According to the question,

X : Y : Z

Capital → 6 : 3 : 1

×2 ×3

∴ Required ratio of capital = **6 : 3 : 1**

17. (a) X : Z | X : Y

$2_{\times 3} : 1_{\times 3} \quad | \quad 3_{\times 2} : 2_{\times 2}$

Note : X will be same in both cases, hence new required ratio

X : Y : Z

6 : 4 : 3

According to the question,

(6 + 4 + 3) units = ₹ 1,57,300

13 units = ₹ 1,57,300

1 unit = ₹ 1,21,00

4 units = ₹ 1,21,00 × 4 = ₹ **4,8400**

∴ Share of Y = ₹ **4,8400**

18. (a) Let the total time = 8 year

Let the total capital = 20 units

X : Y : Z

Capital → 5 : 4 : 11

Time → 2 : 4 : 8

Profit → 10 : 16 : 88

5 : 8 : 44

According to the question,

(5 + 8 + 44) units = ₹ 1140

57 units = ₹ 1140

1 unit = ₹ $\frac{1140}{57}$ = ₹ **20**

Profit of X = 20 × 5 = ₹ 100

Profit of Y = 20 × 8 = ₹ 160

Profit of Z = 20 × 44 = ₹ 880

19. (c) Let total profit = 24 units

Profit of A = $\frac{1}{8} \times 24$ = 3 units

Profit of B = $\frac{1}{3} \times 24$ = 8 units

A : B : C

Capital → x : y : 1560

Time → 4 : 6 : 8

Profit → 3 : 8 : 13 [24 - (8 + 3)]

We know,

Capital × Time = profit

$\frac{\text{Profit}}{\text{Time}} = \text{Capital}$

$\frac{13}{8}$ units = 1560

1 unit = ₹ 960

y = $\frac{960 \times 8}{6}$

y = ₹ 1280

x = $\frac{3}{4} \times 960$ = ₹ 720

Capital of A = ₹ 720

Capital of B = ₹ 1280

20. (d) Let the Capital = 18 units

Let the time = 6 years

X : Y : Z

Capital → 3 : 6 : 9

Time → 1 : 2 : 6

Profit → 3 : 12 : 54

1 : 4 : 18

According to the question,

(1 + 4 + 18) units = ₹ 23000

23 units = ₹ 23000

1 unit = ₹ 1000

4 units = ₹ 1000 × 4 = ₹ 4000

Share of Y is ₹ 4,000

21. (a) Initial Ratio of investments by Rakesh and Bhuvnesh = 2 : 3
Let their respective investments be $2x$ and $3x$
According to the question.
If Rakesh added ₹10,000 to his investment

Then New Ratio = 3 : 2

$$\frac{2x + 10,000}{3x} = \frac{3}{2}$$

$$4x + 20,000 = 9x$$

$$5x = 20000$$

$$x = ₹4000$$

⇒ original investment by Rakesh
= $2 \times 4000 = ₹8000$

Alternative

Rakesh Yadav : Bhuvnesh
 2×2 : 3×2
 3×3 : 2×3

Note : we know Rakesh Yadav has an additional amount. So amount of Bhuvnesh would be same
After that new Ratio

Rakesh
Yadav Bhuvnesh
 4 : 6
 $+5$ $\rightarrow$ 9 : 6

According to the question

$$5 \text{ units} = ₹10,000$$

$$1 \text{ unit} = ₹2,000$$

$$\text{Initial capital of Rakesh Yadav} = 2000 \times 4 = ₹8000$$

22. (d) Let X's capital be ₹ $11x$ and Y's capital be ₹ $12x$
and let time for which Y invested capital is T_2 months
by using formula,

$$\frac{C_1 \times T_1}{C_2 \times T_2} = \frac{P_1}{P_2}$$

$$\frac{11x \times 8}{12x \times T_2} = \frac{2}{3}$$

$$T_2 = 11 \text{ months}$$

Hence, the time for which Y invested his capital is 11 months

23. (c) Total investments by Bhuvnesh, Rakesh and Pawan = ₹47,000

Let amount invested by Pawan = ₹ x
then amount invested by Rakesh = ₹ $(x + 3000)$ [given]

and amount invested by Bhuvnesh = ₹ $(x + 3000 + 5000)$ [given]

According to the question

$$x + (x + 3000) + (x + 3000 + 5000) = 47000$$

$$3x + 11000 = 47000$$

$$3x = 36000$$

$$x = ₹12000$$

	Bhuvnesh	Rakesh	pawan
Ratio of	$(x + 8000)$	$(x + 3000)$	x
Amounts	$(12000 + 8000)$	$(12000 + 3000)$	12000
	20,000	$(12000 + 3000)$	12000
	20	15	12

Since the time for which the amounts were invested was same for all the partners the ratio of amounts will be the ratio of profits
Share of Bhuvnesh out of total profit

$$= \frac{14100}{(20 + 15 + 12)} \times 20 = ₹6000$$

24. (a) Let Bhuvnesh's Capital = ₹ x
Let Ankur's Capital = ₹ y

Now Acc. to question

	Bhuvnesh	Ankur
Capital	x	y
time (in month)	$10(9 + 1)$	9
Ratio of profit we know	5	6

$$\frac{10 \times x}{9 \times y} = \frac{5}{6} \Rightarrow \frac{x}{y} = \frac{3}{4}$$

Hence the required ratio of capital of Bhuvnesh and Ankur is = 3 : 4

25. (b) Total cost of renting a car = ₹4,160

According to the question,

	Manoj	Pradeep	chetan
Time of using car in hours	7	8	11

Here the ratio of time will be the ratio of rent each person has to pay.

⇒ ratio of rents 7 : 8 : 11 to be paid

Rent shared by manoj

$$= \frac{4160 \times 7}{(7 + 8 + 11)} = ₹1120$$

26. (c) Let total profit = 16 units
According to question

$$\text{profit share of pradeep} = \frac{3}{16} \times 16 \text{ units} = 3 \text{ units}$$

$$\text{Profit share of Rakesh} = \frac{1}{4} \times 16 = 4 \text{ units}$$

$$\text{then profit share of Bhuvnesh} = [16 - (4 + 3)] = 9 \text{ units}$$

$$\text{But profit of Bhuvnesh} = ₹243 \text{ [given]}$$

$$9 \text{ units} = ₹243$$

$$1 \text{ unit} = ₹27$$

$$\text{profit share of Rakesh} = 4 \text{ units} = 27 \times 4 = ₹108$$

27. (c) Total profit = ₹880
Since A gets 15% of total profit for management
∴ Remaining profit

$$= 880 - \frac{880 \times 15}{100} = ₹748$$

	Ankur	Chetan
Amounts	5,000	6,000
Ratio of Capital	5	6

The remaining profit is being divided in the ratio of capital.

Ankur's share of profit

$$= \frac{748}{(5 + 6)} \times 5 = ₹340$$

$$\text{Total profit Received by ankur} = 340 + 132 = ₹472$$

28. (b)

	Bhuvnesh	Rakesh	Seemant
Amounts invested	14,000		
time (in months)	12	7	5
	1,68,000		

$$\text{Ratio of profits} = 4 : 3 : 2$$

Let their profits $4x : 3x : 2x$ are
 $4x = 1,68,000$

$$x = \frac{168000}{4} = 42,000$$

$$\Rightarrow \text{profit share of seemant} = (2 \times 42,000) = ₹84,000$$

$$\Rightarrow \text{Capital invested by seemant}$$

$$= \frac{84000}{5} = ₹16,800$$

29. (b) Let total capital of Rakesh, Manoj and Ankur = 15 units
Let total time for investment = 12 units

Now, According to question .

Rakesh Manoj Ankur

$$\text{Capitals } \frac{1}{3} \times 15 \text{ units} \quad \frac{1}{5} \times 15 \text{ units}$$

$$\text{Ratio of time } \left(\frac{5}{3} \times 12 \text{ units} \right) \times \left(\frac{3}{2} \times 12 \text{ units} \right) \times \left(\frac{7}{12} \times 12 \text{ units} \right)$$

$$\text{Ratio of profits } \frac{15}{5} : \frac{6}{2} : \frac{84}{12}$$

$$\text{Total profit} = 5 + 2 + 28 = 35 \text{ units}$$

$$\text{also, total profit} = ₹ 1820 \text{ (Given)}$$

$$35 \text{ units} = ₹ 1820$$

$$1 \text{ unit} = \frac{1820}{35} = ₹ 52$$

Hence Rakesh's share in profit

$$= 5 \text{ units} = 52 \times 5 = ₹ 260$$

30. (c) Let ratio of profit of A and B is a : b.

$$\therefore \text{Ratio of profit of B and C} = a : b$$

$$A : B \quad B : C$$

$$a_{\times a} : b_{\times a} a_{\times b} : b_{\times b}$$

Note: Value of B would be same in both cases.

$$A : B : C$$

$$a^2 : ab : b^2$$

According to the question,

$$a^2 = 6400$$

$$a = 80$$

$$\text{Similarly } b^2 = 10,000$$

$$\Rightarrow b = 100$$

$$\text{Amount received by B} = ab$$

$$= 80 \times 100 = ₹ 8,000$$

$$31. (d) \quad A : B$$

$$\text{Capital} \rightarrow 20,000 : 4,000$$

$$5 : 1$$

$$\text{A's salary} = ₹ 12,000$$

$$\text{Remaining profit} = (1800 - 1200) = ₹ 600$$

$$6 \text{ units} = ₹ 600$$

$$1 \text{ unit} = ₹ 100$$

$$\text{share of A} = 100 \times 5 = ₹ 500$$

$$\text{share of B} = 100 \times 5 = ₹ 100$$

$$\therefore \text{Total share of A} = (1200 + 500) = ₹ 1700$$

$$\text{Total share of B} = ₹ 100$$

32. (a) Let the total share = 100 units

$$\text{share of C} = \frac{100}{4} = 25 \text{ units}$$

Remaining share

$$= (100 - 25) = 75 \text{ units}$$

$$\therefore \text{Share of A} = \frac{75}{(3+2)} \times 3 = 45 \text{ units}$$

$$\text{share of B} = \frac{75}{(3+2)} \times 2 = 30 \text{ units}$$

$$A : B : C$$

New profit

$$\text{Sharing Ratio} = 45 : 30 : 25$$

$$\text{Required Ratio} = 9 : 6 : 5$$

33. (b) Let the total share = 200 units

$$\therefore \text{share of C} = 200 \times \frac{1}{4} = 50 \text{ units}$$

$$\text{Remaining share} = (200 - 50) = 150 \text{ units}$$

$$\therefore \text{share of A} = \frac{200}{(3+2)} \times 3 = 120 \text{ units}$$

$$\text{share of B} = \frac{200}{(3+2)} \times 2 = 80 \text{ units}$$

According to the question,

C receives equal amounts from A and B.

$$\therefore \text{A's remaining share} = (120 - 25) = 95$$

$$\text{B's remaining share} = (80 - 25) = 55$$

$$A : B : C$$

$$\text{New Ratio} \rightarrow 95 : 55 : 50$$

$$19 : 11 : 10$$

$$34. (d) \quad A : B : C$$

$$\text{Ratio of profit} \rightarrow 2 : 3 : 7$$

$$\text{Average gain} = \frac{(2+3+7)}{3}$$

$$= 4 \text{ units}$$

According to the question,

$$4 \text{ units} = ₹ 8000$$

$$1 \text{ unit} = ₹ 2000$$

$$3 \text{ units} = 3 \times 2000 = ₹ 6000$$

$$\therefore \text{share of B} = ₹ 6000$$

$$35. (a) \quad A : B : C$$

$$\text{profit} \rightarrow \frac{1}{4} : \frac{1}{6} : \frac{7}{12}$$

$$3_{\times 9} : 2_{\times 9} : 7_{\times 9}$$

Note: To avoid fraction in calculation multiply all the ratios by 9. After that new Ratio of profits

$$A : B : C$$

$$\text{profit} \rightarrow 27 : 18 : 63$$

New profit of A

$$= 27 + \frac{63}{(5+4)} \times 4 = 55$$

New profit of B

$$= 18 + \frac{63}{(4+5)} \times 5 = 53$$

$$\therefore \text{New profit sharing ratio of A and B} = 55 : 53$$

36. (a)

$$A : B : C$$

$$\text{Capital} \rightarrow 1200 : 800 : 600$$

$$\times \quad \times \quad \times$$

$$\text{Time} \rightarrow \frac{6}{7200} : \frac{7}{5600} : \frac{8}{4800}$$

$$9 : 7 : 6$$

According to the question,

$$(9 + 7 + 6) \text{ units} = ₹ 396$$

$$22 \text{ units} = ₹ 396$$

$$1 \text{ unit} = ₹ \frac{396}{22} = ₹ 18$$

$$\therefore \text{Share of A} = 18 \times 9 = ₹ 162$$

37. (b) Total capital of A invested in 1 year = $48,000 \times 3 + 40,000 \times 9$
 $= 1,44,000 + 3,60,000 = ₹ 5,04,000$
 Total capital of B invested in 1 year = $60,000 \times 6 + 66,000 \times 6$
 $= ₹ 756,000$

$$A : B$$

$$\text{Capital} \rightarrow 504000 : 756000$$

$$\text{Profit} \rightarrow 2 : 3$$

$$\downarrow \times 6000 \quad \downarrow \times 6000$$

$$12,000 : 18,000$$

$$\text{Total profit} = (2 + 3) \times 6000 = ₹ 30,000$$

38. (a)

$$M : P : Q$$

$$\text{Capital} \rightarrow 6500 : 8400 : 10,000$$

$$\times \quad \times \quad \times$$

$$\text{Time} \rightarrow \frac{6}{390} : \frac{5}{420} : \frac{3}{300}$$

$$13 : 14 : 10$$

$$\text{Profit} \rightarrow$$

$$\text{M's extra share on working partner} = 7400 \times \frac{5}{100} = ₹ 370$$

Remaining Profit = ₹ 7400 – ₹ 370
= ₹ 7030

According to the question ,
(13 + 14 + 10) units = ₹ 7030
37 units = ₹ 7030

$$1 \text{ unit} = ₹ \frac{7030}{37}$$

$$10 \text{ units} = ₹ \frac{7030}{37} \times 10 = ₹ 1900$$

39. (a)

Capital → A : B : C
15000 : 12000 : 8000

Time → 8 : 9 : 12
120 : 108 : 96

Profit → 10 : 9 : 8

According to the question ,
(10 + 9 + 8) units = ₹ 10,800
27 units = ₹ 10,800
1 unit = ₹ 400

Difference between A's share and C's

$$\text{Share} = (10 - 8) \times 400 = ₹ 800$$

40. (b)

Capital → A : B : C
50000 : 75000 : 125000

(year) Time → 2 : 3 : 1
100 : 75 : 125
8 : 9 : 10

∴ Required ratio of profit
= 8 : 9 : 10

41. (b)

Capital → A : B : C
45000 : 80000 : 120000

(year) Time → 2 : 3 : 1
90 : 120 : 120
3 : 4 : 4

Required Ratio of profit = 3 : 4 : 4

42. (c)

Capital → A : B : C
48000 : 48000 : 48000
Time → 6 : 10 : 12

Profit → 6 : 10 : 12
3 : 5 : 6

Note: The capital of all the partners are equal so the profit would

be divided in the ratio of their time.

According to the time,
(3 + 5 + 6) units = ₹ 5250
14 units = ₹ 5250
1 unit = ₹ 375

$$\therefore \text{Share of A} = 375 \times 3 = ₹ 1125$$

$$\text{Share of B} = 375 \times 5 = ₹ 1875$$

$$\text{Share of C} = 375 \times 6 = ₹ 2250$$

43. (b) A : B : C
Capital → 60000 : 80000 : 120,000
Time → 4 : 9 : 12

Profit → 240,000 : 720,000 : 1440,000
1 : 3 : 6

According to the question,
(1 + 3 + 6) units = ₹ 1,60,480
10 units = ₹ 1,60,480
1 unit = ₹ 16,048
Share of A = 16,048 × 1 = ₹ 16,048
Share of B = 16,048 × 3 = ₹ 48,144
Share of C = 16,048 × 6 = ₹ 96,288

44. (a) Let the amount invested by A = ₹ x

Now according to the question,

A : B : C
Capital → x : (x + 15000) : (x + 35000)
∴ x + x + 15000 + x + 35000 = ₹ 125000
3x = 125000 – 50000
• 3x = 75000
• x = ₹ 25000

∴ Amount invested by B = ₹ 40,000
Amount invested by C = ₹ 60,000

A : B : C
Capital → 25000 : 40,000 : 60,000
Profit → 5 : 8 : 12

(5 + 8 + 12) units = ₹ 37450
25 units = ₹ 37450
1 unit = ₹ 1498

∴ Share of A = 1498 × 5 = ₹ 7490
Share of B = 1498 × 8 = ₹ 11984
Share of C = 1498 × 12 = ₹ 17976

45. (b) Capital invested by Bhuvnesh = ₹ 42,000

Capital invested by Rakesh yadav = ₹ 49,000

Ratio of profits of Rakesh yadav and Bhuvnesh = 9000 : 7000 = 9 : 7

$$\text{We know, } \frac{C_1 \times T_1}{C_2 \times T_2} = \frac{P_1}{P_2}$$

$$\frac{42,000 \times 12}{49,000 \times T_2} = \frac{9}{7}$$

$$T_2 = 8 \text{ months}$$

It means Rakesh yadav invested his capital for 8 months. It means he joined business after (12 – 8 = 4) months.

46. (c) Ratio of Capital invested by A, B and C = 15 : 10 : 6

Total Capital invested by A in 1 year = 15x × 4 + 30x × 8 = 300x

Total capital invested by B in 1 year = 10x × 6 + 5x × 6 = 90x

Total capital invested by C in 1 year = 6x × 12 = 72x

Ratio of profits :

A : B : C
300x : 90x : 72x
50x : 15x : 12x

According to the question,

$$(50x + 15x + 12x) = ₹ 34650$$

$$77x = ₹ 34650$$

$$x = ₹ \frac{34650}{77} = ₹ 450$$

$$\text{Profit of A} = ₹ 450 \times 50 = ₹ 22500$$

$$\text{Profit of B} = ₹ 450 \times 15 = ₹ 6750$$

$$\text{Profit of C} = ₹ 450 \times 12 = ₹ 5400$$

47. (d) Total capital invested by A in 1 year = 36000 × 12 = ₹ 432000

Total capital invested by B in 1 year = 45000 × 4 + (45000 – 20000) × 5 + (55000 + 25000) × 3

$$= 180000 + 125000 + 240000 = ₹ 545000$$

Ratio of capital 432000 : 545000
Ratio of profit 432 : 545

According to the question,

$$(432 + 545) \text{ units} = 117240$$

$$977 \text{ units} = 117240$$

$$1 \text{ unit} = \frac{117240}{977} = 120$$

$$\text{Difference in profit} = (545 - 432) \times 120 = 13560$$

It means B will get 13560 more than A.

48. (b) A : B : C
 Capital 24000 : 32000 : 18000
 12 : 16 : 9

Let the total profit = 100x
 Extra share of A in Profit

$$= 100x \times \frac{15}{100} = 15x$$

$$\text{Extra share of B} = 100x \times \frac{12}{100} = 12x$$

Remaining profit

$$= [100x - (15x + 12x)] = 73x$$

According to the question,

Note: Remaining profit is distributed in the ratio of their capitals

∴ Share of C

$$= \frac{73x}{(12+16+9)} \times 9 = \frac{657x}{37}$$

$$\frac{657x}{37} = 65700$$

$$x = \frac{65700 \times 37}{657} = 3700$$

∴ Hence Required profit = 100x
 = 100 × 3700 = 3,70,000

49. (c)

	Katrina : Rakesh Yadav : Bhuvnesh		
Ratio of cows	12	16	6
Time	4×2	4×6	9×2
Ratio of Rent	96	384	108
	8	32	9
	× 36	× 36	× 36
	288	1152	324

Total rent (288 + 1152 + 324)
 = Rs. 1764

50. (a)

	A : B : C		
Capital	500	400	800
Time	12	10	6
Profit	6000	4000	4800
	15	10	12

According to the question,
 (15 + 10 + 12) units = Rs. 444
 37 units = Rs. 444

$$1 \text{ unit} = \frac{444}{37} = \text{Rs. } 12$$

Profit of A = 15 × 12 = Rs. 180
 Profit of B = 10 × 12 = Rs. 120
 Profit of C = 12 × 12 = Rs. 144

51. (a) Total capital invested by A in 1 year = 12 × 4000 = Rs. 48000
 Total capital invested by B in 1 year = 6000 × 4 + 8000 × 8 = 24000 + 64000 = Rs. 88000
 Total capital invested by C in 1 year = 8000 × 9 + 3 × 6000 = 72000 + 18000 = 90,000

$$\begin{array}{ccc} \text{A} & : & \text{B} : \text{C} \\ \text{Capital} & 48000 : 88000 : 90,000 \\ & 24 : 44 : 45 \end{array}$$

According to the question,
 (24 + 44 + 45) units = Rs. 16950
 113 units = 16950

$$1 \text{ unit} = \text{Rs. } \frac{16950}{113} = \text{Rs. } 150$$

Hence, Profit of A = 150 × 24 = Rs. 3600

Profit of B = 150 × 44 = 6600

Profit of C = 150 × 45 = 6750

52. (d) A : B : C = $\frac{1}{4} : \frac{1}{3} : \frac{1}{6}$

Ratio of shares of A, B and C

$$\begin{array}{ccc} \text{A} & : & \text{B} : \text{C} \\ \text{Capital} & 3x : 4x : 2x \end{array}$$

Total capital invested by A in 1 year

$$= 3x \times 4 + 1.5x \times 8 = 24x$$

Total capital invested by B in 1

$$\text{year} = 4x \times 6 + \frac{4x}{3} \times 6 = 32x$$

Total capital invested by C in 1 year = 2x × 12 = 24x

$$\text{A} : \text{B} : \text{C}$$

$$\text{Capital } 24x : 32x : 24x$$

$$3x : 4x : 3x$$

According to the question,

$$(3x + 4x + 3x) = 14000$$

$$10x = 14000$$

$$x = 1400$$

Profit of A = 1400 × 3 = Rs. 4200

Profit of B = 1400 × 4 = Rs. 5600

Profit of C = 1400 × 3 = Rs. 4200

53. (b) A : B : C

$$\text{Capital } 25x : 16x : 24x$$

Total capital of A in 1 year

$$= 25x \times 3 + (37.5x) \times 9$$

$$= 75x + 337.5x = 412.5x$$

Total capital of B in 1 year

$$= 16x \times 12 = 192x$$

Total capital of C in 1 year
 = 24 × 12x = 288x

$$\text{A} : \text{B} : \text{C}$$

$$\text{Capital } 412.5x : 192x : 288x$$

According to the question,

$$(412.5x + 192x + 288x) = 35700$$

$$= \frac{35700}{892.5} = \text{Rs. } 40$$

Share of A = 412.5 × 40 = Rs. 16500

54. (c) Total profit = Rs. 4000

According to the question,

20% of B's capital = Rs. 4000

$$1\% \text{ of B's capital} = \frac{4000}{20}$$

$$\text{B's total capital} = \frac{4000}{20} \times 100 = \text{Rs. } 20,000$$

Let total capital required for business = 100 units.

$$\begin{array}{ccc} \text{A} & : & \text{B} : \text{C} \\ \text{Capital} & 30 & 40 : 30 \end{array}$$

$$\begin{array}{ccc} \downarrow \times 500 & \downarrow \times 500 & \downarrow \times 500 \\ 15,000 & : & 20,000 : 15,000 \end{array}$$

Hence, Required capital for C
 = Rs. 15,000

55. (a) Note: In such type of question we can assume ratio as per our need to avoid fraction.

$$\text{Capital} \rightarrow \frac{\text{A}}{7 \times 3} : \frac{\text{B}}{9 \times 3}$$

$$\text{New Ratio, } \rightarrow \frac{\text{A}}{21x} : \frac{\text{B}}{27x}$$

Total capital invested by A in 9 months = 21x × 3 + 7x × 6 = 105x

Total capital of B invested in 9 months = 27x × 4 + 18x × 5 = 108x + 90x = 198x

$$\text{A} : \text{B}$$

$$\text{Capital } 105x : 198x$$

According to the question,

$$(105x + 198x) = 10201$$

$$303x = 10201$$

$$x = \text{Rs. } \frac{10201}{303}$$

$$\text{Hence, Share of A} = 105 \times \frac{10201}{303} = \text{Rs. } 3535$$

$$\text{Share of B} = 198 \times \frac{10201}{303} = \text{Rs. } 6666$$

56. (b) Interest for A

$$= \frac{42000 \times 7 \times 1}{100} = 2940$$

$$\text{Interest for B} = \frac{48000 \times 7 \times 1}{100} = \text{Rs. } 3360$$

$$\text{Interest for C} = \frac{32000 \times 7 \times 1}{100} = \text{Rs. } 2240$$

Total interest of

$$(A + B + C) = (2940 + 3360 + 2240) = \text{Rs. } 8540$$

$$\text{Remaining profit} = \text{Rs. } (32940 - 8540) = \text{Rs. } 24400$$

$$\begin{array}{ccc} A & : & B & : & C \\ \text{Capital} & 42000 & : & 48000 & : & 32000 \\ & 21 & : & 24 & : & 16 \end{array}$$

According to the question,

$$(21 + 24 + 16) \text{ units} = \text{Rs. } 24400$$

$$61 \text{ units} = \text{Rs. } 24400$$

$$1 \text{ unit} = \text{Rs. } 400$$

$$\text{Hence, Share of A in Remaining profit} = 400 \times 21 = 8400$$

$$\text{Share of B in remaining profit} = 400 \times 24 = \text{Rs. } 9600$$

$$\text{Share of C in remaining profit} = 400 \times 16 = \text{Rs. } 6400$$

$$\therefore \text{Total share of A} = 8400 + 2940 = \text{Rs. } 11340$$

57. (a)

$$\begin{array}{cc} A & B \\ \text{Rs. } 20,000 \times 2 & \text{Rs. } 30,000 \times 2 \\ = 40,000 & = 60,000 \\ 40,000 \times 10 & 50,000 \times 10 = 500,000 \\ \hline 44,000 & 560,000 \end{array}$$

$$\text{B's share} = \frac{14}{25} \times 75000 = \text{Rs. } 42000$$

58. (b)

$$\begin{array}{ccc} A & : & B & : & C \\ \frac{1}{6} \times 2 & : & \frac{1}{3} \times 4 & : & \frac{1}{2} \times 12 \\ \frac{1}{3} & : & \frac{4}{3} & : & 6 \\ 1 & : & 4 & : & 18 \end{array}$$

$$\text{A's share} = 46000 \times \frac{1}{23} = \text{Rs. } 2000$$

59. (a)

$$A : B : C$$

$$\text{Capital } 3 : 4 : 2$$

$$\text{Profit } 1 : 2 : 3$$

$$C \times T = P$$

$$\begin{aligned} T &= \frac{P}{C} = \frac{1}{3} \times 12 : \frac{2}{4} \times 12 : \frac{3}{2} \times 12 \\ &= 4 : 6 : 18 = 2 : 3 : 9 \end{aligned}$$

60. (b) A B

$$\frac{5}{9} \quad \frac{4}{9}$$

$$\frac{A}{B} = \frac{5 \times 6}{4 \times T} = \frac{5}{4}$$

Time (T) = 6 months

61. (a) A B

$$\begin{array}{r} 16800 \\ -5200 \\ \hline 11,600 \end{array} \quad \begin{array}{r} 11200 \\ +5200 \\ \hline 16,400 \end{array}$$

$$\begin{array}{ccc} 29 & : & 41 \\ 2000 &) & (2000 \end{array}$$

$$58000 \quad 1 \rightarrow 82000$$

$$1 \text{ Unit} = \text{Rs. } 2000$$

$$\text{Therefore, the value of X} = \text{Rs. } 2000$$

62. (c) A : B

$$5 : 2$$

A's salary for management

$$= \frac{1}{5} \times 7 = 1.4$$

$$\text{profit for sharing} = 7 - 1.4 = 5.6$$

$$\text{Now, A's part} = 1.4 + \frac{5}{7} \times 5.6 = 5.4$$

$$\text{B's part} = \frac{2}{7} \times 5.6 = 1.6$$

According to question

$$5.4 - 1.6 = 38000$$

$$1 \text{ unit} = 38000 \div 3.8 = 10,000$$

$$\text{therefore, total profit} = ₹ 70,000$$

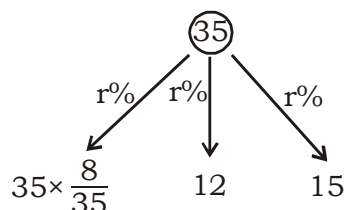
63. (a) A : B : C

$$8 \quad 12 \quad 15$$

$$\text{Let Total profit} = 8 \times 5 = 40$$

$$\text{A's salary} = 1 \times 5 = 5$$

$$\text{Distributed} = 7 \times 5 = 35$$



$$\begin{array}{r} 8 \\ +5 \\ \hline 13 \rightarrow 5200 \end{array}$$

$$\text{Total profit} = 40 \times 400 = ₹ 16000$$

64. (a) A : B : C

$$20,000 : 35000 :$$

$$(12)4_{\times 3} : 7_{\times 3}(21) = 33$$

$$\frac{1(11)}{-1} : \frac{1(11)}{-10} : 1(11) = 33$$

$$A : B$$

$$1 : 10$$

$$\text{A will get} = 2,20,000 \times \frac{1}{11} = 20,000$$

$$\text{B will get} = 2,20,000 \times \frac{10}{11} = 2,00,000$$

65. (a) share of Rent will be in the ratio of

$$A : B : C$$

$$10 \times 7 : 12 \times 5 : 15 \times 3$$

$$14 : 12 : 9$$

$$\text{A will pay} = 17.50 \times \frac{14}{35} = \text{Rs. } 7$$

$$\text{B will pay} = 17.50 \times \frac{12}{35} = \text{Rs. } 6$$

$$\text{C will pay} = 17.50 \times \frac{9}{35} = \text{Rs. } 4.5$$

66. (c)

$$\begin{array}{ccc} A & B & C \\ 16000 \times 3 & : & 12000 \times 3 \\ +11000 \times 9 & : & 17000 \times 9 \quad 21000 \times 6 \\ A & : & B & : & C \\ 147000 & : & 189000 & : & 126000 \\ 147 & : & 189 & : & 126 \\ 7 & : & 9 & : & 6 \end{array}$$

$$\text{On Rs. } 22 \text{ difference} = 3$$

$$\text{On Rs. } 26400 \text{ difference}$$

$$= \frac{3}{22} \times 26400 = \text{Rs. } 3600$$

67. (d) Let amount invested by Ramesh = x

So profit share will be

$$= \frac{20000 \times 6}{x \times 12} = \frac{6000}{3000}$$

$$\text{Rs. } 1,20,000 = 24x$$

$$x = \text{Rs. } 5000$$

68. (c)

Kishan Nandan

$$\text{Investment } 3 : 1$$

$$\text{time } 2 : 1$$

$$\text{Ratio of profit sharing will be } 6 : 1$$

$$1R = 4000$$

$$\text{total profit } 7R = 4000 \times 7$$

$$= \text{Rs. } 28000$$

69. (c) Let C invests = x Rs.
 then investment of B = $x + 5000$
 and of A = $x + 9000$
 $3x + 14000 = 50000$
 $3x = 36000$
 $x = 12000$ (investment of C)
 Then A's share = $12000 + 9000$
 $= 21000$
 B's share = $12000 + 5000$
 $= 17000$
 C's share = 12000
 Ratio of Profit will be
 A : B : C
 21 : 17 : 12

Then A will get = $35000 \times \frac{21}{50}$
 $= \text{Rs. } 14700$

70. (b) Time duration of A = 12 months
 Time duration of B = $(12 - x)$
 Same as that of C = $(12 - x)$
 A : B : C
 $50000 \times 12 : 60000(12 - x) : 70000(12 - x)$

$$\frac{60}{6(12 - x)} = \frac{20}{18}$$

$$12 - x = 9$$

$$x = 3 \text{ months}$$

71. (b) A : B
 $25000 : 35000$
 $5 : 7$
 Profit $\rightarrow 12$
 C Wants it to be divided equally,

$$\begin{array}{r} 12 \\ \swarrow 4 \\ \downarrow 4 \\ \searrow 4 \\ \hline 12 \end{array}$$

$$\begin{array}{r} A : B : C \\ 5 : 7 : - \\ -1 \swarrow 5 \quad -3 \swarrow 7 \\ 4 : 4 : 4 \\ \hline 1 : 1 : 1 \end{array}$$

This will go to C

$$\begin{array}{r} 1 \\ \swarrow 1 \\ \downarrow 1 \\ \searrow 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 1 \\ \swarrow 1 \\ \downarrow 1 \\ \searrow 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 1 \\ \swarrow 1 \\ \downarrow 1 \\ \searrow 1 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 1 \\ \swarrow 1 \\ \downarrow 1 \\ \searrow 1 \\ \hline 1 \end{array}$$

Hence, Required ratio = 1 : 3

72. (c) A : B : C
 $1500 \times 12 : 2000 \times 9 : 2250 \times 8$
 $18000 : 18000 : 18000$
 (equal)

$$\text{Share of B} = \frac{900}{3} = \text{Rs. } 300$$

73. (d) A : B : C
 $50 \times 4 : 45 \times 6 : 70 \times 6$
 $25 \times 8 : 22.5 \times 6$
 $400 : 405 : 420$
 $80 : 81 : 84$

74. (d) A : B : C
 $16000 \times 3 : 15000 \times 3 : -$
 $\frac{11000 \times 9}{147} : \frac{20,000 \times 9}{225} : \frac{21,000 \times 6}{126} \rightarrow 498$
 $498 \text{ units} = 24900$

$$C = \frac{24900}{498} \times 126 = \text{Rs. } 6300$$

75. (a) Let total capital be 6 (LCM 3, 6)

$$\begin{array}{r} A : B : C \\ 1 \times 2 : 2 \times 4 : 3 \times 12 \\ 2 : 8 : 36 \\ 1 : 4 : 18 \end{array}$$

$$23 \text{ units} = 23,000$$

$$B's \text{ share} = \frac{4}{23} \times 23,000 = \text{₹ } 4000$$

76. (c) Let capital be 20.

$$\begin{array}{r} A : B : C \\ 5 \times 3 : 4 \times 6 : 11 \times 12 \\ 15 : 24 : 132 \\ 5 : 8 : 44 \end{array}$$

$$\therefore \text{Ratio} = 5 : 8 : 44$$

77. (c) Profit = capital $\times$ time

$$\Rightarrow P = C \times T \therefore T = \frac{P}{C}$$

$$\begin{array}{r} A : B : C \\ C : 5 : 6 : 8 \\ P : 5 : 3 : 12 \end{array}$$

$$T = \frac{P}{C} \quad 1 : \frac{1}{2} : \frac{3}{2}$$

$$\therefore \text{Ratio} = 2 : 1 : 3$$

78. (c) $T = \frac{P}{C}$ and $C = \frac{P}{T}$.

(Let profit be 24) (LCM of 8 & 3)

$$\begin{array}{r} A : B : C \\ T : 4 : 6 : 8 \\ P : 3 : 8 : 13 \\ \therefore C : \frac{3}{4} \times 24 : \frac{4}{6} \times 24 : \frac{8}{13} \times 24 \\ \text{Ratio} = 18 : 32 : 39 \end{array}$$

$$79. (d) \frac{A}{B} = \frac{100 \times 8}{C \times 2} = \frac{2}{3}$$

$$\begin{array}{r} \text{Capital} \\ 300 \times 8 = 4C \\ \therefore C = 600 \end{array}$$

$$80. (a) A : B \\ 5 : 2$$

$$A's \text{ salary} = \frac{1}{5} \times 7 = 1.4$$

$$\text{profit for sharing} = 7 - 1.4 = 5.6$$

$$\text{Now, A's part} = 1.4 + \frac{5}{7} \times 5.6 = 5.4$$

$$B's \text{ part} = \frac{2}{7} \times 5.6 = 1.6$$

According to question

$$5.4 - 1.6 = 38000$$

$$1 \text{ unit} = 38000 \div 3.8 = 10,000$$

$$\text{therefore, total profit} = \text{₹ } 70,000$$

81. (b) A : B : C = 8 : 12 : 15 $\rightarrow 35$

$$12 \frac{1}{2} \% = \frac{1}{8} = \frac{A's \text{ salary}}{\text{Total profit}}$$

$$= \frac{1 \times 5}{8 \times 5} = \frac{5}{40}$$

$$\therefore \text{Distributed profit} = 7 \times 5,$$

$$A's \text{ profit} = 5 \times 1$$

$$\begin{array}{r} A : B : C \\ 8 : 12 : 15 \end{array}$$

$$\begin{array}{r} \downarrow +5 \\ 13 : 12 : 15 \end{array}$$

$$\therefore \text{Total Profit} = \frac{40}{13} \times 5200 = \text{₹ } 16,000$$

82. (c) A : B

$$\begin{array}{r} 5 : 7 \\ \swarrow 5 \quad \searrow 7 \\ 12 \end{array}$$

$$\therefore 2 \text{ Units} = 90$$

$$1 \text{ unit} = 45$$

$$\therefore 12 \text{ units} = 45 \times 12 = 540$$

According to question

$$30\% = 540$$

$$\therefore 100\% = \frac{540}{30} \times 100 = \text{Rs. } 1800$$

83. (a)

A	:	B
3		2
×19	(95)	×19
57		38

$$5\% = \frac{1 \times 5 \text{ (donated)}}{20 \times 5 \text{ (total profit)}}$$

$$\text{distributed} = 95$$

$$\text{donated} = 5$$

$$\therefore 57 \text{ units} \rightarrow 8550$$

$$\therefore \text{Total profit} = \frac{8550}{57} \times 100 = ₹15,000$$

84. (c)

$$\text{Total profit} = \text{Rs. } 125 \begin{cases} \nearrow A = \text{Rs. } 100 \\ \searrow B = \text{Rs. } 25 \end{cases}$$

$$\therefore A : B$$

$$P \quad 100 \quad 25 \quad \text{or} \quad 4 : 1$$

$$T \quad 8 \quad 4 \quad \text{or} \quad 2 : 1$$

$$C = \frac{P}{T} \quad 2 : 1 \quad (2 - 1) = \text{Rs. } 375$$

$$\therefore A = 375 \times 2 = \text{Rs. } 750$$

85. (b)

$$\text{Total profit} = \text{Rs. } 358 \begin{cases} \nearrow A = \text{Rs. } 200 \\ \searrow B = \text{Rs. } 158 \end{cases}$$

$$\therefore A : B$$

$$T \rightarrow 4 \quad 7$$

$$P \rightarrow \frac{200}{4} \quad \frac{158}{7} \text{ or } 100 : 79$$

$$\therefore C \rightarrow \frac{200}{4} \quad \frac{158}{7} = 175 : 79$$

$$\text{Diff} = 96 \text{ units} = 768$$

$$\therefore B = \left(\frac{768}{96} \times 79 \right) = \text{Rs. } 632$$

86. (b) Let total capital be Rs. 100

$$\text{Profit} = 4\% \Rightarrow A = 4 \times \frac{5}{8} = \frac{20}{8}$$

$$\text{Profit} = 9\% \Rightarrow A = 9 \times \frac{5}{8} = \frac{45}{8} \quad \text{Rs. } 450$$

$$\therefore \frac{45}{8} - \frac{20}{8} = \frac{25}{8} \text{ units} = \text{Rs. } 450$$

$$\therefore \text{Total capital} = \frac{450}{\frac{25}{8}} \times 8 \times 100 = 14,400$$

$$\therefore A : B + C$$

$$5 \quad 3$$

$$\therefore B + C = \frac{3}{8} \times 14400 = \text{Rs. } 5400$$

$$\therefore B = C = \text{Rs. } 2700$$

87. (c) Let the Capital be 100

$$\text{Profit} = 10\% \Rightarrow 10 \times \frac{2}{7} = \frac{20}{7}$$

$$\text{Profit} = 15\% \Rightarrow 15 \times \frac{2}{7} = \frac{30}{7} \quad \text{Rs. } 240$$

$$\therefore \frac{10}{7} \text{ units} = \text{Rs. } 240$$

$$\therefore \text{Total capital} = \frac{240}{\frac{10}{7}} \times 7 \times 100 = \text{Rs. } 16,800$$

$$A : B + C$$

$$2 : 5$$

$$\therefore B + C = \frac{5}{7} \times 16800 = \text{Rs. } 12,000$$

$$\therefore B = C = \text{Rs. } 6000$$

88. (a) A : B

$$4 : 7$$

$$\text{or } 12 : 21 \text{ (divisible by 3)}$$

$$\text{After C comes, } A : B : C = 11 : 11 : 11$$

A	B	C
4	7	—
-1 (12)	-10 (21)	—
11	11	11

$$\therefore B = \frac{10}{11} \times 2,20,000 = \text{Rs. } 2,00,000$$

$$A = \frac{1}{11} \times 2,20,000 = \text{Rs. } 20,000$$

Hence, Required ratio

$$= 20,000 : 2,00,000$$

$$1 : 10$$

89. (d)

A	B
Invest. 2	1
= 200	100

Now

A	B
200 × 10 + 2 × 150	100 × 8 + 50 × 4
= 2300	1000

$$\text{Required ratio} = 23 : 10$$

90. (a)

A	B
Invest. 3	5
= 300	500

Now,

Required Ratio

$$300 \times 12 : 500 \times 12 : 6 \times 500$$

$$6 : 10 : 5$$

91. (c)

A	B	C
16000 × 3	12000 × 3	21000 × 6
+ 11000 × 9	+ 17000 × 9	
= 49	63	42
= 7	9	6

$$\therefore 22 \text{ units} = 26400$$

$$\therefore 1 \text{ units} = \frac{26400}{22}$$

$$\therefore 3 \text{ units} = ₹3600$$





08

AVERAGE

Average

The average is nothing but the sum of all observations divided by the number of observations. This is also known as arithmetic mean of the given observations or average value or mean value.

i.e.

$$\text{Average(A)} = \frac{\text{Sum of given observations/Quantities}}{\text{Number of observations/Quantities}}$$

Some key terms:-

- Average of a given term is always lies in range at given data.

i.e.

$$\text{Lowest Quantity} \leq \text{Average} \leq \text{Greatest quantity}$$

- If the quantities of given data are equal then the average will also be the same as quantities.
i.e. Average = Greatest / Lowest quantity
Value of all quantities = Average
(No greatest or lowest exist)
- If '0' is one of the quantities of a given data, then that '0' will also be included while calculating average.

Average Speed

If a person cover a certain distance at a speed of A km/h and again cover the same distance at a speed of B km/h, then the average speed during the whole journey will be

$$\frac{2AB}{A+B}$$

If distance 'A' is covered with speed a, distance 'B' is covered with speed b and distance 'c' is covered with speed c, then for the whole journey:

$$\text{Average speed} = \frac{A+B+C+\dots\dots\dots}{\frac{A}{a} + \frac{B}{b} + \frac{C}{c} + \dots\dots\dots}$$

Helping point:-

Sum of arithmetic progression whose first term is "a" last term is $[a + (n-1)d]$.

$$S_n = \frac{n}{2} \times [2a + (n-1)d]$$

Sum of geometric progression whose first term is [a], last term is $[ar^{n-1}]$ and common ratio is (r)

$$= \frac{a[r^n - 1]}{r - 1} \quad \text{if } r > 1$$

$$= \frac{a[1 - r^n]}{1 - r} \quad \text{if } r < 1$$

$$\begin{aligned} * \text{ Sum of first } n \text{ natural no.} &= \frac{n(n+1)}{2} \\ \text{Average of first } n \text{ natural no.} &= \frac{(n+1)}{2} \end{aligned}$$

$$\begin{aligned} * \text{ Sum of squares of first } n \text{ natural no.} &= \frac{n(n+1)(2n+1)}{6} \\ \text{Avg. of squares of first } n \text{ natural no.} &= \frac{(n+1)(2n+1)}{6} \end{aligned}$$

$$\begin{aligned} * \text{ Sum of cubes of first } n \text{ natural no.} &= \left[\frac{n(n+1)}{2} \right]^2 \\ \text{Average of cubes of first } n \text{ natural} &= \frac{n(n+1)^2}{4} \end{aligned}$$

$$\begin{aligned} * \text{ Sum of first } n \text{ natural odd no.} &= n^2 \\ \text{Avg. of first } n \text{ natural odd no.} &= n \end{aligned}$$

$$\begin{aligned} * \text{ Sum of first } n \text{ natural Even no.} &= n(n+1) \\ \text{Average of first } n \text{ natural Even no.} &= (n+1) \end{aligned}$$

Examples

1. Find the average of first 73 numbers:

- (a) 37 (b) 36
(c) 73 (d) 72

Sol. (a) $1 + 2 + 3 + \dots + 72 + 73$

$$\begin{aligned} &= \frac{n(n+1)}{2} \\ &= 2701 \end{aligned}$$

$$\text{Average} = \frac{2701}{73} = 37$$

$$\text{Alteranate:- Average} = \frac{n+1}{2} = 37$$



2. The average of 47 numbers is 459. If each of the number is divided by 17, find the new average:

(a) 27 (b) 28
(c) 21 (d) 26

Sol. (a) $\frac{459}{17} = 27$,

Note : When all the no. are divided or multiplied by an arbitrary no. then the average also get divided or multiplied accordingly.

3. The average of 107 number is 33. If each of the number is multiplied by 13, find the new average:

(a) 439 (b) 429
(c) 419 (d) 423

Sol. (b) $33 \times 13 = 429$

Hence, Answer will be divided 3 and 11

4. The average of 11 result is 50. If the average of the first six result is 49 and that of the last six is 52, the sixth result is :

(a) 48 (b) 50
(c) 52 (d) 56

Sol. (d)

$$\frac{A+B+C+D+E+F+G+H+I+J+K}{11}$$

The average of 1st 6 result = 49

The average of the last 6 result = 52

The Average of total result is= 50

$$6^{\text{th}} \text{ result} = (52 \times 6 + 49 \times 6) - (11 \times 50) = 56$$

5. The average of 50 numbers is 45. The average of 50 number and 3 new numbers is 51. The average of the three new number will be :

(a) 153 (b) 151
(c) 157 (d) 351

Sol. (b) Total of 3 Numbers
 $= (50 + 3) \times 51 - 50 \times 45$
 $= 453$

The average of 3 new result

$$\text{will be } = \frac{453}{3} = 151$$

6. The average of salary of 20 workers in an office is Rs.2100 per month. If the manager's salary is added, the average becomes Rs.2200 per month. The manager's annual salary is (in Rs.) :

(a) 4200 (b) 4000
(c) 48,000 (d) 50,400

Sol. (d) manager's salary = $2200 \times 20 - 2100 \times 20 = 4200$

Then manager's annual salary = $4200 \times 12 = \text{Rs. } 50,400$

7. In a class, there are 10 students at the age of 15 years, 15 at the age of 16 years and 5 at the age of 14 years. What is the average age of a student:

(a) $15\frac{2}{3}$ (b) $15\frac{1}{3}$
(c) $14\frac{3}{4}$ (d) 15

Sol. (b) Average age of a student

$$= \frac{10 \times 15 + 15 \times 16 + 5 \times 14}{10 + 15 + 5}$$

$$= \frac{460}{30} = 15\frac{1}{3}$$

8. The average age of 54 boys in a class is 21 years. If the 'lecture-spell check's age is included the average age of the boys and lecturer becomes 21 year 6 month. What is the lecturer's age :

(a) 48 years 3 month
(b) 48 year
(c) 47 year 6 month
(d) 48 year 6 month

Sol. (d) Lecturer's age is = $21.5 + 54(21.5 - 21) = 48.5 \text{ years}$

9. A family consist of grandparents, parent and three children. The average age of the

grandparents is 67 years, that of the parents is 35 years and that of the children is 6 years. What is the average age of the family?

(a) $28\frac{4}{7}$ (b) $31\frac{5}{7}$

(c) $32\frac{1}{7}$ (d) $32\frac{5}{7}$

Sol. (b) Required average

$$= \frac{67 \times 2 + 35 \times 2 + 6 \times 3}{2 + 2 + 3}$$

$$= 31\frac{5}{7} \text{ years}$$

10. A library has an average of 510 visitors on friday and 240 on other days. The average number of visitors per day in a month at 30 days beginning with a friday is :

(a) 250 (b) 276
(c) 280 (d) 285

Sol. (d) If the month starts with a Friday, then there will be 5 Friday in the month

Required average

$$= \left(\frac{510 \times 5 + 240 \times 25}{30} \right) = \frac{8550}{30} = 285$$

11. A student was asked to find the arithmetic mean of the following 12 numbers:

3, 11, 7, 9, 15, 13, 8, 19, 17, 21, 14 and x

He found the mean to be 12. The value of x will be.

(a) 3 (b) 7
(c) 7 (d) 31

Sol. (b) mean

$$= \frac{3+11+9+7+15+13+8+19+17+21+14+x}{12}$$

According to question,

$$\frac{137+x}{12} = 12$$

$$\therefore 137 + x = 144$$

$$\therefore x = 144 - 137 = 7$$



12. The average height of 16 boys in a class is 50.25 inches and 8 boys is 45.15 inches. Find the average height of all boys in the class :

(a) 47.55 inches
(b) 48 inches
(c) 48.55 inches
(d) 49.25 inches

- Sol.** (c) The required average height

$$= \left(\frac{50.25 \times 16 + 45.15 \times 8}{16 + 8} \right)$$

$$= 48.55$$

13. The average score of a cricketer for 5 matches is 38.9 runs. If the average of first three matches is 42, find the average for the last two matches :

(a) 33.25 (b) 33.5
(c) 34.25 (d) 35

- Sol.** (c) The average of last 2 games

$$= \frac{5 \times 38.9 - 42 \times 3}{2} = \frac{68.5}{2}$$

$$= 34.25$$

14. The average runs of a cricket player of 5 innings was 62. How many runs must he make in his next innings so as to increase his average of runs by 4?

(a) 88 (b) 87
(c) 86 (d) 84

- Sol.** (c) The runs to be scored by him in 6th innings

$$= 62 + 6 \times 4 = 86$$

15. In the first 20 overs of a cricket game, the run rate was only 3.2. What should be the run rate in remaining 30 overs to reach the target 262?

(a) 5.6 (b) 7.2
(c) 6.6 (d) 8.8

- Sol.** (c) Score of 20 overs

$$= 3.2 \times 20 = 64$$

Score of 30 overs

$$= 262 - 64 = 198$$

Average of remaining overs

$$= \frac{198}{30} = 6.6$$

16. If the average of first 75 innings is 35. How much should he scored in his 76 innings to increase his average by 2 runs?

(a) 186 (b) 189
(c) 187 (d) 188

- Sol.** (c) Score of 76th innings

$$= 35 + 2 \times 76 = 187$$

17. A car travels from Delhi to Agra at the rate of 20km/hour and from Agra to Delhi at the rate of 30km/hour. What is average speed whole journey ?

(a) 18km/hr (b) 20km/hr
(c) 25km/hr (d) 24km/hr/.

- Sol.** (d) Average speed

$$= \frac{2(20 \times 30)}{20 + 30} = 24 \text{ km/hr}$$

18. The average weight of five persons sitting in a boat is 38 kg. The average weight of the boat and the persons sitting in the boat is 52 kg. What is the weight of the boat ?

(a) 228 kg (b) 122 kg
(c) 232 kg (d) 242 kg

- Sol.** (b) Weight of the boat

$$= 52 \times (5 + \text{Boat}) - 5 \times 38$$

$$= 312 - 190 = 122 \text{ kg}$$

19. The mean of 50 observations was 36. It was found later that an observation 48 was wrongly taken as 23. The corrected (new) mean is :

(a) 35.2 (b) 36.1
(c) 36.5 (d) 39.1

- Sol.** (c) Total sum of 50 observations = $50 \times 36 = 1800$

The correct mean

$$= \frac{1800 - 23 + 48}{50} = \frac{1825}{50} = 36.5$$

20. The average of eight successive numbers is 6.5. The average of the smallest and the greatest numbers among them will be :

(a) 4 (b) 6.5
(c) 7.5 (d) 9

- Sol.** (b) $x + x + 1 + x + 2 + x + 3 + x + 4 + x + 5 + x + 6 + x + 7 = 6.5 \times 8$

$$= 52$$

$$\Rightarrow 8x + 28 = 52$$

$$\Rightarrow 8x = 52 - 28 = 24$$

$$\Rightarrow x = 3$$

$\therefore$ Required average

$$= \frac{3 + 10}{2} = 6.5$$

21. The average temperature of the first 4 days of a week was 37°C and that of the last 4 days of the week was 41°C. If the average temperature of the whole week was 39°C, the temperature of the fourth days was :

(a) 38°C (b) 38.5°C
(c) 39°C (d) 40°C

- Sol.** (c) $M + T + W + TH = 4 \times 37$

$$= 148^\circ\text{C} \dots\dots\dots(i)$$

$$TH + F + S + S = 4 \times 41$$

$$= 164^\circ\text{C} \dots\dots\dots(ii)$$

$$M + T + \dots\dots\dots S + S = 7 \times 39$$

$$= 273^\circ\text{C} \dots\dots\dots(iii)$$

$$\therefore \text{Temperature of 4th days}$$

$$= 148 + 164 - 273 = 39^\circ\text{C}$$

22. The average of five numbers is 7. When three new numbers are included, the average of the eight numbers becomes 8.5. The average of the three new numbers is :

(a) 9 (b) 10.5
(c) 11 (d) 11.5

- Sol.** (c) Total sum of new three no.

$$= 8 \times 8.5 - 5 \times 7 = 68 - 35 = 33$$

$$\therefore \text{Required average} = \frac{33}{3} = 11$$

23. The average of x numbers is y



and Avg. of y numbers is x . Then the average of all the numbers taken together is :

(a) $\frac{x+y}{2xy}$ (b) $\frac{2xy}{x+y}$

(c) $\frac{x^2+y^2}{x+y}$ (d) $\frac{x+y}{x+y}$

Sol. (b) Sum of x numbers = xy

Sum of y no. = xy

Required average

$$= \frac{xy + xy}{x + y} = \frac{2xy}{x + y}$$

24. 5 members of a team are weighed Respectively and calculation of their Avg. weight is done after each member is weighed. If the average weight increase by one kg each time, how much heavier is the last player than the first one ?

- (a) 5 kg. (b) 8 kg.
(c) 4 kg. (d) 20 kg.

Sol. (b) Average₁ = x , weight₁ = x
Average₂ = $x + 1$, Weight₂ = $x + 2$
Average₃ = $x + 2$, Weight₃ = $x + 4$
Average₄ = $x + 3$, Weight₄ = $x + 6$
Average₅ = $x + 4$, Weight₅ = $x + 8$
Hence, Difference between 5th and 1st = 8 kg.

25. The average score of a group of 20 students in a test was 52. The brightest 20% of them secured a average score of 80 and the duller 25% a average score of 31. The mean score of remaining :

- (a) 45% (b) 50%
(c) 51.4% (d) 54.6%

Sol. (c) $20\% = \frac{1}{5}$, $25\% = \frac{1}{4}$ L.C.M = 20

remaining average

$$= \frac{20 \times 52 - 20 \times \frac{1}{5}(80) - 20 \times \frac{1}{4}(31)}{(20 - 5 - 4 = 11)}$$

$$= 51.4$$

26. The average age of four players is 18.5 years. If the age of the coach is also included, the average age is increased by 20%. The age of coach is :

- (a) 31 years (b) 37 years
(c) 28 years (d) 34 years

Sol. (b) New average

$$= 18.5 \times \frac{6}{5} = 22.2$$

age of coach

$$[(22.2 \times 5) - (18.5 \times 4)] = 37 \text{ years}$$

27. The average age of 9 member of a group is 30 years. If the age of one person is 55 years and that is replaced with a another person whose age is 28 years. Then find the average age of the new group ?

- (a) 29 (b) 28
(c) 27 (d) 27 year 6 month

Sol. (c) Age difference in replaced member = $55 - 28$

$$= 27 \text{ years}$$

Hence, New average

$$= 30 - \frac{(27)}{9} = 27 \text{ years}$$

28. The grocer has a sale of Rs.7435, Rs.7927, Rs.7855, Rs.8230 and Rs. 7562 for 5 consecutive months. How much sale must he have in sixth month so that he get an average sale Rs. 7500 ?

- (a) Rs.5991 (b) Rs. 6991
(c) Rs. 7991 (d) Rs.7001

Sol. (a) Sales 6 months

$$= 7500 \times 6 - (7435 + 7927 + 7855 + 8230 + 7562) = \text{Rs. } 5991$$

29. Of the four numbers, whose average is 60, the first is one-fourth of the sum of the last three. The first number is :

- (a) 15 (b) 45
(c) 48 (d) 60.25

Sol. (c) Average of four no. = 60

$$\therefore \text{Sum of four no.} = 60 \times 4 = 240$$

A.T.Q Let first no. = x

$$\therefore x = \frac{1}{4} (240 - x)$$

$$4x = 240 - x$$

$$5x = 240$$

$$x = 48$$

30. A batsman in his 12th innings, makes a score of 63 runs and thereby increase his average score by 2. The average of his score his score after 12th innings is:

- (a) 41 (b) 42
(c) 34 (d) 35

Sol. (a) Average of the 11th innings batsman = $63 - 12 \times 2 = 39$

$$\text{Required average} = 39 + 2 = 41$$

31. Of the four number, the first is twice of the second, the second is one-third of the third and the third is 5 times the fourth. The average of the number 24.75. The largest of these number is :

- (a) 9 (b) 25
(c) 30 (d) 45

Sol. (d) Let the 4th = x

$$\text{Then, 3rd no.} = 5x$$

$$\text{Second} = \frac{5x}{3} \text{ and 1st no.} = \frac{10x}{3}$$

$$x + 5x + \frac{5x}{3} + \frac{10x}{3} = (24.75 \times 4)$$

$$11x = 99 \Rightarrow x = 9$$

$$\text{Hence no. is} = 45$$

32. Find the average of integers between 1 and 200 which are divisible by 13

- (a) 104 (b) 105.5
(c) 105 (d) 104.5

Sol. (a) Series is 13, 26, -----
--182, 195

$$\text{Number of term} = \frac{195 - 13}{13} + 1 = 15$$

$$\text{Average becomes} = \frac{13 + 195}{2} = 104$$



33. The average monthly salary of A and B is Rs. 14000, that of B and C is Rs. 15600, and that of A and C is Rs. 14400. B's Monthly salary is :

(a) Rs.12400 (b) Rs.12800
(c) Rs.15200 (d) Rs.16000

Sol. (c) $A+B = 14000 \times 2$ (i)
 $B+C = 15600 \times 2$ (ii)
 $A+C = 14400 \times 2$ (iii)

$$2(A+B+C) = 2(44000)$$

$$A+B+C = 44000 \text{ (iv)}$$

$$A+C = 28800$$

$$B = 15200$$

$\therefore$ B's monthly salary = 15200

34. 30 pens and 75 pencils altogether were purchased for Rs.510. If the average price of a pencil was Rs.2, what was the average price of a pen ?

(a) Rs.9 (b) Rs.10
(c) Rs.11 (d) Rs.12

Sol. (d) Let 1 Pen = Rs. x , then

$$30x + 75 \times 2 = 510$$

$$\Rightarrow 30x = 510 - 150 = 360$$

$$\Rightarrow x = \frac{360}{30} = \text{Rs. } 12$$

35. The average of 18 observations is recorded as 124. Later it was found that two observations with values 64 and 28 were entered wrongly as 46 and 82. Find the correct average of the 18 observations :

(a) $111\frac{7}{9}$ (b) 122

(c) 123 (d) $137\frac{3}{9}$

Sol. (b) Difference in observation
 $= 64 + 28 - 46 - 82 = -36$
 $\therefore$ Correct answer

$$= 124 - \frac{36}{18} = 122$$

36. The average age of 11 players of a cricket team is increased by 2 months when two of them aged 18 years and 20 years are replaced by two new players. The average age of the new players:

(a) 19 years 1 month
(b) 19 years 6 months
(c) 19 years 11 months
(d) 19 years 5 months

Sol. (c) Total increase = 11×2
 $= 22$ month

$\therefore$ The sum of age both cricketers

$= (18 + 20)$ years 22 month

$= 38$ years 22 month

$\therefore$ average age = 19 years 11 months

37. Out of three numbers, the first is twice of the second and is half of the third. If the average of the three numbers is 56, then difference of first and third numbers is:

(a) 12 (b) 20
(c) 24 (d) 48

Sol. (d) Let first no = $2x$

second = x

Third = $4x$

$$4x + 2x + x = 56 \times 3$$

$$7x = 168$$

$$x = 24$$

$$(3\text{rd} - \text{first}) = 2x = 24 \times 2 = 48$$

38. 12 kg of rice costing Rs. 30 per kg is mixed with 8 kg of rice costing Rs.40 per kg. The average age per kg price of mixed rice is:

(a) Rs.38 (b) Rs.37
(c) Rs.35 (d) Rs.34

Sol. (d) Total cost price of 20 kg mix rice $\text{Rs.}(12 \times 30 + 8 \times 40)$
 $= \text{Rs. } 680$

$\therefore$ Average cost of per kg

$$= \frac{680}{20} = \text{Rs. } 34$$

39. A tabulator while calculating the average marks of 100 students of an examination, by mistake enters 68, instead of 86 and obtained the average as 58; the actual average marks of those students is :

(a) 58.18 (b) 57.82
(c) 58.81 (d) 57.28

Sol. (a) Difference = $86 - 68 = 18$

$$\therefore \text{Original average} = 58 + \frac{18}{100}$$

$$= 58.18$$

40. The average of n numbers is $x_1, x_2, \dots, x_n$ is $\bar{x}$. Then the

value of $\sum_{i=1}^n (x_i - \bar{x})$ is equal to:

(a) n (b) 0
(c) $n\bar{x}$ (d) $\bar{x}$

Sol. (b) $\frac{x_1 + x_2 + \dots + x_n}{n} = \bar{x}$

$$\therefore \sum_{i=1}^n (x_i - \bar{x})$$

$$= (x_1 - \bar{x}) + (x_2 - \bar{x}) + \dots + (x_n - \bar{x})$$

$$= (x_1 + x_2 + \dots + x_n) - n\bar{x}$$

$$= n \left(\frac{x_1 + x_2 + \dots + x_n}{n} \right) - n\bar{x}$$

$$= n\bar{x} - n\bar{x} = 0$$

41. The batting average of a cricket player for 64 innings is 62 runs. His highest score exceeds his lowest score by 180 runs. Excluding these two innings, the average of remaining innings becomes 60 runs. His highest score was :

(a) 180 runs (b) 209 runs
(c) 212 runs (d) 214 runs

Sol. (d) Let the no. of runs the cricketer x , then

$$\therefore 60 \times 62 + x + x - 180 = 64 \times 62$$

$$\Rightarrow 3720 + 2x - 180 = 3968$$

$$\Rightarrow 2x = 428$$

$$\Rightarrow x = 214 \text{ run}$$



42. The mean weight of 34 students of a school is 42 kg. If the weight of the teacher be included, the mean rises by 400 grams. Find the weight of the teacher (in kg) :

(a) 55 (b) 57
(c) 66 (d) 56

Sol. (d) Teacher's weight

$$= 42 \text{ kg.} + \frac{35 \times 400}{1000}$$

$$= 42 + 14 = 56 \text{ kg.}$$

43. While purchasing one item costing Rs.400, one has to pay sales tax at 7% and on another costing Rs.6400, the sales tax one has to pay at 9%, taking these items together on an average is:

(a) $8\frac{13}{17}$ (b) $8\frac{15}{17}$

(c) $8\frac{1}{2}$ (d) 8

Sol. (b) Sold in Rs. 400 on sales tax

$$= \frac{400 \times 7}{100} = \text{Rs.} 28$$

Sales tax on the article sold at Rs. 6400

$$= \frac{6400 \times 9}{100} = \text{Rs.} 576$$

Total tax = 28 + 576 = Rs. 604
Percentage sales tax

$$= \frac{604}{6800} \times 100 = \frac{151}{17} = 8\frac{15}{17} \%$$

44. The average age of Ram and Shyam is 36 year. The average of Shyam and Rohan is 35 year and the average age

of Ram and Rohan is 29 year. Find out the age of Ram after 20 year from now:

(a) 40 year (b) 55 year
(c) 70 year (d) 50 year

Sol. (d) Total age of Ram and Shyam = 72 years

Total age of Shyam and Roshan = 70 years

Total age of Ram and Rohan = 58 years

Then, Total age of Ram, Shyam and Rohan

$$= \frac{72 + 70 + 58}{2} = 100$$

Present age of Ram's

= 100 - 70 = 30 years

after 20 years Ram's age

= 50 years

45. The average of A,B,C,D,E,F,G and H is 20. The average of A

and B is $15\frac{1}{2}$ and that of C,D

and E is $21\frac{1}{3}$. If the F be less than G and H by 4 and 7 respectively, then the value of H is :

(a) 18 (b) 22

(c) 25 (d) 27

Sol. (c) Total of, A,B,C,D,E,F,G and H = $20 \times 8 = 160$

F = H - 7, G = H - 3

$$160 = 2 \times \frac{31}{2} + 3 \times \frac{64}{3} + H - 7 + H - 3 + H$$

$$3H = 75, \quad H = 25$$

46. A certain factory employed 500 men and 300 women and the average wage was Rs. 22.5. If a woman got 4 less than a man, than what are their daily wages?

(a) 24, 20 (b) 26, 20

(c) 20, 22 (d) 22, 26

Sol. (a) Let the men's wages (x)

Then, Women wages becomes (x - 4)

$$(500 + 300) \times (22.5) = 500(x) + 300(x - 4)$$

$$18000 = (500 + 300)x - 1200$$

$$800x = 19200$$

$$x = 24$$

man salary = 24

women salary = 20

47. The average salary at all the workers in a workshop is Rs.8000. The average salary of the 9 technicians is Rs. 12,000 and the average salary of the rest is Rs.6500. The total number of workers in the workshop is :

(a) 31 (b) 32

(c) 33 (d) 34

Sol. Let the total no. of workers = x then,

$$8000 \times x = 12000 \times 9 + 6500 (x - 9)$$

$$8000x - 6500x = 108000 - 58500$$

$$1500x = 49500$$

$$x = 33$$

48. Geeta has twice as much money as that of Rita and Rita has 50% more money than that of Sita. If the average money of all of them is Rs.220 then the money which Geeta has is:

(a) Rs.110 (b) Rs.360

(c) Rs.180 (d) Rs.120

Sol. (b) Let

Gita : Rita : Sita

$$6x \quad 3x \quad 2x$$

$$6x + 3x + 2x = 220 \times 3$$

$$11x = 660 \Rightarrow x = 60$$

$$\text{Gita} = 6x = 6 \times 60 = 360$$

49. A car covers 180 km at 60km/hr, 160 km at 80km/hr and 300 km at 60 km/hr. Then find the average speed in covering the whole distance.

(a) 66km/hr (b) 64km/hr

(c) 60km/hr (d) 63km/hr

$$\text{Sol. (b)} \quad \frac{180 + 160 + 300}{\frac{180}{60} + \frac{160}{80} + \frac{300}{60}}$$

$$= \frac{640}{3 + 2 + 5} = 64 \text{ km / hr}$$



50. Find the average of below series

$$\frac{1}{1 \times 2}, \frac{1}{2 \times 3}, \frac{1}{3 \times 4}, \dots, \frac{1}{(n-1) \times n}, \frac{1}{n \times (n+1)}$$

(a) $\frac{1}{n+1}$ (b) $\frac{1}{n(n+1)}$

(c) $\frac{1}{n^2+1}$ (d) $\frac{2}{n+1}$

Sol. (a) average = $\frac{\text{Total sum}}{\text{Number of quantities}}$

$$\text{Sum} = \frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots$$

$$\dots + \frac{1}{(n-1) \times n} + \frac{1}{n(n+1)}$$

$$= \left(1 - \frac{1}{2}\right) + \left(\frac{1}{2} - \frac{1}{3}\right) + \dots$$

$$\dots + \left(\frac{1}{n-1} - \frac{1}{n}\right) + \left(\frac{1}{n} - \frac{1}{n+1}\right)$$

$$= 1 - \frac{1}{n+1} = \frac{n}{n+1}$$

$$\text{Average} = \frac{n/n+1}{n} = \frac{1}{n+1}$$

Alternate Method:

put $n = 2$

$$\text{average} = \frac{\text{Total sum}}{\text{Number of quantities}}$$

$$= \frac{\frac{1}{1 \times 2} + \frac{1}{2 \times 3}}{2} = \frac{1}{3}$$

Answer Options:

(a) $\frac{1}{2+1} = \frac{1}{3}$ (Correct)

(b) $\frac{1}{2(2+1)} = \frac{1}{6}$ (Wrong)

(c) $\frac{1}{2^2+1} = \frac{1}{5}$ (Wrong)

(d) $\frac{2}{2+1} = \frac{2}{3}$ (Wrong)

51. A cricketer whose bowling average is 24.85, runs per wicket, takes 5 wickets for 52 runs and thereby decreases his average by 0.85. The number of wickets taken by him till the last match was:

(a) 64 (b) 72
(c) 80 (d) 96

Sol. (c) Let the number of wickets taken till the last match be n .

$\therefore$ Total runs at 24.85 runs per wicket = 24.85n

Total runs after the current match

$$= 24.85n + 52$$

Bowling Average after the current match

$$= \frac{24.85n + 52}{n+5} = 24.85 - 0.85$$

$$\therefore \frac{24.85n + 52}{n+5} = 24$$

$$\text{or, } 24.85n + 52 = 24n + 120$$

$$\text{or, } 0.85n = 120 - 52$$

$$\text{or, } n = \frac{68}{0.85} = 80$$

52. In a family of 8 adults and some minors, the average consumption of rice per head per month is 10.8 kg; while the average consumption for adults is 15 kg per head and for minors it is 6 kg per head. The number of minors in the family is :

(a) 8 (b) 6
(c) 7 (d) 9

Sol. (c) Let the number of minors be x .

According to the question,

$$\frac{8 \times 15 + x \times 6}{8+x} = 10.8$$

$$\Rightarrow 120 + 6x = 86.4 + 10.8x$$

$$\Rightarrow 10.8x - 6x = 120 - 86.4$$

$$\Rightarrow 4.8x = 33.6$$

$$\Rightarrow x = \frac{33.6}{4.8} = 7$$

53. The average score of a class of boys and girls in the class 3 : 1. If the average score of the boys is $A + 1$, the average score of the girls is :

(a) $A + 1$ (b) $A - 1$
(c) $A + 3$ (d) $A - 3$

Sol. (d) Let the number of boys in the class be $3x$. The ratio of boys and girls in the class is 3 : 1, then the number of girls in the class is x .

$\therefore$ Average score of the girls

$$= \frac{(3x+x) \times A - 3x(A+1)}{x}$$

$$= \frac{4xA - 3xA - 3x}{x}$$

$$= \frac{x(A-3)}{x} = \frac{x(A-3)}{x} = A-3$$

54. The average mathematics marks of two sections A and B of Class IX in the annual examination is 74. The average marks of Section A is 77.5 and that of Section B is 70. The ratio of the number of students of Section A and B is :

(a) 7 : 8 (b) 7 : 5
(c) 8 : 7 (d) 8 : 5

Sol. (c) If the number of students in section A be x and that in section B be y , then

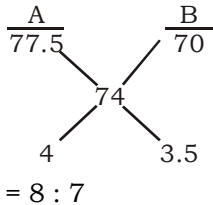
$$74 = \frac{77.5x + y \times 70}{x+y}$$

$$\Rightarrow 74x + 74y = 77.5x + 70y$$

$$\Rightarrow 77.5x - 74x = 74y - 70y$$

$$\Rightarrow 3.5x = 4y$$

$$\Rightarrow \frac{x}{y} = \frac{4}{3.5} = \frac{8}{7}$$

**Alternate:**

55. In an examination, the average of marks was found to be 50. For deducting marks for computational errors, the marks of 100 candidates had to be changed from 90 to 60 each and so the average of marks came down to 45. The total number of candidates, who appeared at the examination, was:

- (a) 600 (b) 300
(c) 200 (d) 150

Sol. (a) Let total number of candidates be x .

$$\therefore 50x - 30 \times 100 = 45x$$

$$\Rightarrow 5x = 3000$$

$$\Rightarrow x = \frac{3000}{5} = 600$$

56. A student finds the average of ten 2-digit numbers. While copying numbers, by mistake, he writes one number with its digits interchanged. As a result his answer is 1.8 less than the correct answer. The difference of the digits of the number, in which he made mistake, is :

- (a) 2 (b) 3
(c) 4 (d) 6

Sol. (a) Difference in average = 1.8
 $\therefore$ Difference between the number and the number formed by interchanging the digits = $1.8 \times 10 = 18$

$$\therefore 53 - 35 = 18$$

$$\therefore \text{Number} = 35$$

$$\therefore \text{Difference of digits} = 5 - 3 = 2$$

57. The average of three numbers is 40. The first number is twice the second and the second one is thrice the third number. The difference between the largest and the smallest numbers is:

- (a) 30 (b) 36
(c) 46 (d) 60

Sol. (d) Let the third number be x .

$$\text{Second number} = 3x$$

$$\text{First number} = 6x$$

$$x + 3x + 6x = 3 \times 40$$

$$\Rightarrow 10x = 120$$

$$\Rightarrow x = 12$$

$$\therefore \text{Required difference}$$

$$= 6x - x = 5x = 5 \times 12 = 60$$

58. There are in all, 10 balls; some of them are red and the others white. The average cost of all balls is Rs. 28. If the average of red balls is Rs. 25 and that of white balls is Rs. 30, the number of white balls is:

- (a) 3 (b) 5
(c) 6 (d) 7

Sol. (c) Let the number of white balls be x .

$$\therefore \text{Number of red balls} = (10 - x)$$

$$\therefore 10 \times 28 = x \times 30 + 25(10 - x)$$

$$\Rightarrow 280 = 30x + 250 - 25x = 5x + 250$$

$$\Rightarrow 5x = 280 - 250 = 30$$

$$\Rightarrow x = 6$$

59. B was born when A was 4 years 7 months old and C was born when B was 3 years 4 months old. When C was 5 years 2 months old, then their average age was:

- (a) 8 years 9 months
(b) 7 years 3 months
(c) 8 years 7 months
(d) 8 years 11 months

Sol. (d) C = 5 years 2 months

$$B = 8 \text{ years } 6 \text{ months}$$

$$A = 13 \text{ years } 1 \text{ month}$$

$$\therefore \text{Average} = \frac{29 \text{ years } 6 \text{ months}}{3}$$

$$= 9 \text{ years } 11 \text{ months}$$

60. Out of nine persons, 8 persons spent Rs. 30 each for their meals. The ninth one spent Rs. 20 more than the average expenditure of all the nine. The total money spent by all of them was:

- (a) Rs. 260 (b) Rs. 290
(c) Rs. 262.50 (d) Rs. 400.50

Sol. (c) Expenditure of 9th person = Rs. x

$$\therefore x - \frac{x + 8 \times 30}{9} = 20$$

$$\therefore \frac{9x - x - 240}{9} = 20$$

$$\Rightarrow 8x - 240 = 180$$

$$\Rightarrow 8x = 240 + 180 = 420$$

$$\Rightarrow x = \frac{420}{8} = 52.5$$

$$\text{Total expenditure} = 52.5 + 240 = \text{Rs. } 292.5$$

61. The mean of 100 items was 46. Later on it was discovered that an item 16 was misread as 61 and another item 43 was misread as 34. It was also found that the number of items was 90 and not 100. Then what is the correct mean?

- (a) 50 (b) 50.7
(c) 52 (d) 52.7

Sol. (b) Required Average

$$= \frac{100 \times 46 - 61 - 34 + 16 + 43}{90}$$

$$= \frac{4600 - 36}{90} = \frac{4564}{90} = 50.7$$

62. In the afternoon, a student read 100 pages at the rate of 60 pages per hour. In the evening, when she was tired, she read 100 more pages at the rate of 40 pages per hour. What was her average rate of reading, in pages per hour?

- (a) 60 (b) 70
(c) 48 (d) 56



Sol. (c) Required average rate of

$$\text{reading} = \frac{100+100}{\frac{100}{60} + \frac{100}{40}}$$

$$= \frac{200}{\frac{5}{3} + \frac{5}{2}} = \frac{200}{\frac{10+15}{6}} = \frac{200 \times 6}{25} = 48 \text{ pages/hour}$$

63. The average monthly expenditure of a family is Rs. 2200 during first three months, Rs. 2,550 during next four months and Rs. 3,120 during last five months of the year. If the total savings during the year was Rs. 1,260, what is the average monthly income ?

- (a) 1,260 (b) 1,280
(c) 2,805 (d) 2,850

Sol. (c) Total expenditure of the year

$$= \text{Rs. } (3 \times 2200 + 4 \times 2550 + 5 \times 3120)$$

$$= \text{Rs. } (6600 + 10200 + 15600) = \text{Rs. } 32400$$

$$\therefore \text{Total income of the year}$$

$$= \text{Rs. } (32400 + 1260)$$

$$= \text{Rs. } 33660$$

$$\therefore \text{Average monthly income}$$

$$= \text{Rs. } \frac{33660}{12} = \text{Rs. } 2805$$

64. There are 48 students in a class. The age one of them is twice that of another. If these 2 are replaced by 2 others whose ages are 16 years and 11 years respectively, the average age of the class increases by 1.5 months. Find the age of the younger of the 2 students (in years) who left.

- (a) 6 (b) 7
(c) 8 (d) 9

Sol. (b) Avg of 48 students increases by 1.5 months

$$\text{So increase in sum} = 48 \times 1.5 = 72 \text{ months}$$

So we can see that the new 2 students have 6 years more than the older students it means their sum of age must be
 $= 27 - 6 = 21 \text{ years}$
 age of younger student will be

$$= 21 \times \frac{1}{3} = 7 \text{ yrs}$$

65. In a company of 20 employees each person gets a salary of Rs. 8000 per month. Ten employees were promoted and got 22.5 % increase in their salary. Two other employees left the company. Find the average income (RS.) of the remaining 18 employees:

- (a) 900 (b) 8888.89
(c) 9500 (d) 9000

Sol. (d) increased salary of 10 employees

$$= 8000 \times \frac{122.5}{100} = 9800$$

increase in avg will be

$$= \frac{(9800 - 8000) \times 10}{18} = 1000$$

$$\text{So new avg} = 8000 + 1000 = 9000$$

66. In a town during certain week, every day there was a 1°C , increase in temperature over the previous day. If the average temperature for the first and last days (i.e. Mondays and Sunday) was 37°C , what was the average temp. of Monday, Tuesday and Wednesday is?

- (a) 36°C (b) 34°C
(c) 38°C (d) 35°C

Sol. (d) Let temp is $x^\circ\text{C}$ on Monday then on Sunday = $(x + 6)^\circ\text{C}$

$$\text{So, } x + (x + 6) = 37 \times 2$$

$$2x + 6 = 74$$

$$x = 34^\circ$$

Now Temp on Monday = 34

on Tuesday = 35

and on Wednesday = 36

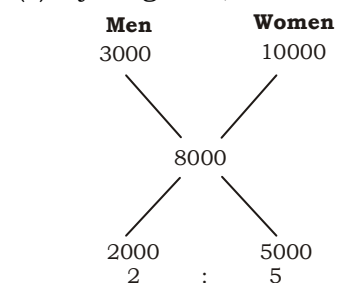
Avg of (Mon, Tue, Wed)

$$= \frac{34 + 35 + 36}{3} = 35^\circ\text{C}$$

67. In an office, the average salary of the men is Rs. 3000. The average salary of all the employees is Rs. 8000. There are 80 men in the office and the average salary of the women employees is Rs. 10000. Find the number of women in the office:

- (a) 100 (b) 120
(c) 150 (d) 200

Sol. (d) By alligation,



$$2R = 80$$

$$\text{Then women (5 R)} = \frac{80}{2} \times 5 = 200$$



EXERCISE

1. Find the Average of first 13 odd no.
(a) 13 (b) 11
(c) 12 (d) 9
2. Find the Average of square of first 17 natural no.
(a) 105 (b) 110
(c) 115 (d) 100
3. The Average of 9 observations is 87. If the Average of first five observations is 79 and the Average of next three is 92. Find the 9th observation.
(a) 111 (b) 112
(c) 110 (d) 113
4. The Average of 7 data is 34 and the Average of first 3 data is 28 and the Average of next two data is 47. Find the average of last 2 data.
(a) 15 (b) 20
(c) 25 (d) 30
5. The average of 9 data is 79. The average of first two data is 75. and the average of next four data is 87. If the 8th data is 5 more than 7th data and 1 more than 9th data. Calculate 9th observation.
(a) 69 (b) 70
(c) 72 (d) 71
6. The Average of 8 number is 20. The avg. of first two number is 15.5 and the avg. of next 3 number is $21\frac{1}{3}$. If the 6th no. is 4 less than the 7th and 7 less than the 8th number Find the 8th number ?
(a) 25 (b) 30
(c) 35 (d) 20
7. The average age of 30 students of a class is 14 years 4 months. Due to admission of 5 new students the average becomes 13 years 9 months, while the age of the younger one among new 5 students is 9 years 11 months. Find the average of remaining four new students.
(a) 10 (b) $31/3$
(c) $34/3$ (d) $32/3$
8. 9 Girls and 1 Boy go to a restaurant for lunch. If each girl spent ₹ 30 and boy spent ₹ 72000 more than the average of expenditures of all. Find the amount spent by the boy.
(a) ₹ 80000 (b) ₹ 85000
(c) ₹ 80030 (d) ₹ 90000
9. 3 years ago the average of family of five members was 17 years. A baby having been born the average age of the family is the same today. Find the age of the baby now.
(a) 1 (b) 2
(c) 3 (d) 4
10. The average age of mother, father and son was 42 years at the time of the marriage of the son. After 1 year an infant was born and after 6 years of marriage the average age of the family becomes 36 years. Find the age of the bride at the time of the marriage.
(a) 25 (b) 20
(c) 30 (d) 20
11. The average temp. of Monday, Tuesday, Wednesday and Thursday is 31°C and the average temp of Tuesday, Wednesday, Thursday and Friday is 29.5°C . If the average of temp on Monday was $37\frac{1}{2}\%$ more than the average temp of Friday. Find the temp. of Monday.
(a) 21°C (b) 20°C
(c) 22°C (d) 23°C
12. The average temp from Monday to Wednesday is 37°C while the average temp from Tuesday to Thursday is 34°C . The temp of Thursday is $4/5$ times to that on Monday. Find the temp on Thursday.
(a) 31°C (b) 36°C
(c) 30°C (d) 35°C
13. There were 42 students in a Hostel due to admission of 13 new students expense of mess is increased by Rs. 30 per day while per day expenditure per student is reduced by Rs. 3. What was the original expenditure of mess per day.
(a) 600 (b) 610
(c) 630 (d) 620
14. There are 4 natural no. if average of any 3 no. is added with 4th no. 29, 23, 21 and 17 will be obtain find all 4 natural no.?
(a) 18, 21, 6, 3
(b) 21, 15, 12, 6
(c) 18, 15, 12, 9
(d) 21, 12, 9, 3
15. There are 3 natural no. if average of any 2 no. is added to the third no. 24, 20 and 18 will be obtained. Find all the natural no.
(a) 6, 8, 17 (b) 9, 6, 16
(c) 9, 5, 17 (d) 12, 6, 13
16. The average age of boys of a school is 12 years and of girls is 11 years. If the total no. of boys is 480. Then find the no. of girls if the average age of school 11 years 9 months.
(a) 160 (b) 150
(c) 140 (d) 170
17. If the bowling average of a bowler is 12.4 run per wicket. He takes 10 wickets in his next innings by giving 52 runs, due to this his bowling average is improved by 0.4 run per wicket. Find the total no. of wickets taken by him at present.
(a) 150 (b) 160
(c) 180 (d) 170
18. A batsman scores 87 runs in his 17th innings due to this his average increased by 3 runs. Find his current average.
(a) 35 (b) 40
(c) 36 (d) 39



19. The bowling average of a bowler in certain matches is 12.4 runs per wicket. If he takes 5 wickets for 26 runs in his next innings then his bowling average becomes 12 runs per wicket. Find the wickets taken by him in the last inning.
(a) 90 (b) 85
(c) 80 (d) 95
20. The average weight of some students in a class is 43 kg. When 4 new students are included the average weight becomes 42.5 kg and the weight of those 4 students are 42, 36.5, 39 and 42.5 kg. Find the total no. of students in the class.
(a) 20 (b) 24
(c) 22 (d) 30
21. A batsman has an average of 30 runs in his 42 innings. The difference between his max. and min. score is 100. If these 2 innings are removed his average for 40 innings comes down to 28. What is his max. score?
(a) 120 (b) 110
(c) 125 (d) 130
22. The average of six innings of a player is 3.95. The average of two innings is 3.4 while the average of next two innings is 3.85. What is the average of last two innings:
(a) 4.5 (b) 4.6
(c) 4.9 (d) 4.8
23. A batsman in his 16th innings makes a score of 60 and there by increase his average by 3. What is his average after 16th innings ?
(a) 18 (b) 20
(c) 15 (d) 21
24. The average of five consecutive natural number is m. If the next three natural numbers are also included, how much more than m will the average of these numbers be?
- (a) 1 (b) 1.5
(c) 1.4 (d) 2
25. The average of four positive integers is 72.5. The highest integer is 117 and the lowest integer is 15. The difference between the remaining two integers is 12. Which is the higher of these two remaining integer ?
(a) 70 (b) 73
(c) 85 (d) Can't be determined
26. The average of nine consecutive odd numbers is 53. The least odd number is :
(a) 22 (b) 27
(c) 35 (d) 45
27. The average of all odd numbers less than 100 is :
(a) 49.5 (b) 50
(c) 50.5 (d) 51
28. The average of seven consecutive positive integers is 26. The smallest of these integers is:
(a) 21 (b) 23
(c) 25 (d) 26
29. Total weekly emoluments of the workers of a factory is Rs.1534. Average weekly emolument of a worker is Rs. 118. The number of workers in the factory is :
(a) 16 (b) 14
(c) 13 (d) 12
30. The average of 10 numbers, a student, by mistake, wrote 64 in place of a number 46 and got his correct average 50. The correct average of the given numbers is:
(a) 48.2 (b) 48.3
(c) 49.1 (d) 49.3
31. If the average of 20 observations $x_1, x_2, \dots, x_{20}$ is y , then the average of $x_1 - 101, x_2 - 101, x_3 - 101, \dots, x_{20} - 101$ is :
(a) $y - 20$ (b) $y - 101$
(c) $20y$ (d) $101y$
32. The average of 27 numbers is 60. If one number is changed from 28 to 82, the average is :
(a) 56 (b) 58
(c) 62 (d) 64
33. The mean value of 20 observations was found to be 75, but later on it was detected that 97 was misread as 79. Find the correct mean.
(a) 75.7 (b) 75.8
(c) 75.9 (d) 75.6
34. The average of 7 consecutive numbers is 20. The largest of these numbers is :
(a) 24 (b) 23
(c) 22 (d) 20
35. Eight consecutive numbers are given. If the average of the two numbers that appear in the middle is 6, then the sum of the eight given numbers is:
(a) 54 (b) 64
(c) 36 (d) 48
36. The average of seven numbers is 18. If one of the numbers is 17 and if it is replaced by 31, then the average becomes :
(a) 21.5 (b) 19.5
(c) 20 (d) 21
37. If the mean of 4 observations is 20, when a constant 'C' is added to each observation, the mean becomes 22. The value of C is:
(a) 6 (b) -2
(c) 2 (d) 4
38. The mean of 11 numbers is 35. If the mean of first 6 numbers is 32 and that of the last 6 numbers is 37, find the sixth number :
(a) 28 (b) 29
(c) 30 (d) 27
39. The average weight of the 8 oarsmen in boat is increased by $1\frac{1}{2}$ kg when one of the crew who weighs 60 kg is replaced by a new man. The weight of the new man in kg is :
(a) 70 (b) 68
(c) 71 (d) 72
40. Average of first five odd multiples of 3 is :
(a) 12 (b) 16
(c) 15 (d) 21
41. If the average of x numbers is y^2 and that of y number is x^2 then the average $(x + y)$ number is:
(a) $\frac{x}{y}$ (b) $x - y$
(c) xy (d) $|x - y|$



42. If a,b,c,d,e,f,g are seven consecutive even integers, then what is their average ?
- (a) $\frac{abcdefg}{7}$
 (b) $7(a + b + c + d + e + f + g)$
 (c) $a + 6$
 (d) $a + 4$
43. A car owner buys petrol at Rs.60, Rs.80, Rs.48 per litre for three successive years. What approximately is the average cost per litre of petrol if he spends Rs.12000 each year?
- (a) Rs.50 (b) Rs. 60
 (c) Rs. 75 (d) Rs.80
44. The batting average for 40 innings of a cricket player is 40 runs. His highest score exceed his lowest by 56. If these two innings are excluded, the average of remaining 38 innings is 38 runs. The highest score of the player is (in runs):
- (a) 106 (b) 50
 (c) 104 (d) 52
45. A cricketer has a certain average for 10 innings. In the eleventh innings, he scored 158 runs, thereby increasing his average by 10 runs. His new average is :
- (a) 58 (b) 68
 (c) 48 (d) 78
46. A batsman has a certain average in 11 innings. In the 12th innings, he scored 90 runs and his average decrease by 5. After the 12th innings what his average?
- (a) 150 (b) 145
 (c) 155 (d) 140
47. A man buys a certain number of oranges at 20 for Rs.60 and an equal number at 30 for Rs.60. Find average rate of a orange?
- (a) Rs. 2.5 (b) Rs. 2.4
 (c) Rs. 2 (d) Rs. 3
48. The average monthly salary of the workers in a workshop is Rs.8,500. If the average monthly salary of 7 technicians is Rs. 10,000 and average monthly salary of the rest is Rs. 7,800, the total number of workers in the workshop is:
- (a) 18 (b) 20
 (c) 22 (d) 24
49. A lady bought 13 tops of Rs.50 each, 15 pants of Rs 60 each, 12 pairs of shoes at Rs.65 a pair and 20 pairs of socks at Rs.16 a pair. Find the average value of a article :
- (a) Rs.52 (b) Rs.44 $\frac{1}{6}$
 (c) Rs.54 (d) Rs.55
50. If constant distance from home to school is covered by a boy at 10km/hr. The boy comes back the same distance at 15km/hr. Find his average speed during the whole journey
- (a) 12.5km/hr (b) 12km/hr
 (c) 10km/hr (d) 13km/hr
51. A person divides his total route of journey into three equal parts and decides to travel the three parts with speeds of 20,15 and 12km/hr. respectively. Find his average speed during the whole journey :
- (a) 18km/hr (b) 16km/hr
 (c) 13km/hr (d) 15km/hr
52. The average age of Australian cricket team of 11 players playing the Delhi test is 30 years. The average age of 5 of the players is 28 years and that of another set of 5 players, totally different from first five is 29.5. If it is the wicketkeeper who was not included in either of these two groups, then find the age of the wicketkeeper years :
- (a) 41.5 (b) 42.5
 (c) 43.5 (d) 42
53. 19 person want to a hotel for a combined dinner party. 13 of them spent Rs.79 each on their dinner and rest spent Rs. 4 more than the average expenditure of all the 19. What was the total money spent by them(approx):
- (a) Rs.1536 (b) Rs.1836
 (c) Rs.1742 (d) Rs.1652
54. A certain number of trucks were required to transport 60 tons of steel wire from FLET factory in Raigarh. However, it was found that since each truck cargo could take 0.5 tons less, another 4 trucks were needed. How many trucks were initially planned to be used?
- (a) 10 (b) 15
 (c) 20 (d) 24
55. A cricketer has a certain average of runs for his 8 innings, in the ninth innings, he scores 100 runs, thereby increases his average by 9 runs. His new average is :
- (a) 20 (b) 24
 (c) 28 (d) 32
56. The average marks of 100 students were found to be 40. Later on it was discovered that a score of 53 was misread as 83. find the correct average corresponding to the correct score :
- (a) 38.7 (b) 39
 (c) 39.7 (d) 41
57. The average weight of a group of 20 boys was calculated to be 89.4 kg and it was later discovered that one weight was misread as 78 kg instead of 87 kg. The correct average weight is :
- (a) 88.95 kg (b) 89.25 kg
 (c) 89.55 kg (d) 89.85 kg
58. The average of runs scored by a player in 10 innings is 50. How many runs should he score in the 11th innings so that his average is increased by 2 runs ?
- (a) 80 runs (b) 72 runs
 (c) 60 runs (d) 24 runs
59. While finding the average of 10 given numbers, a student, by mistake, wrote 64 in place of a number 46 and got his correct average 50. The correct average of the given numbers is :
- (a) 48.2 (b) 48.3



- (c) 49.1 (d) 49.3
60. The average of three numbers is 135. The largest number is 195 and the difference between the other two is 20. The smallest number is :
(a) 65 (b) 95
(c) 105 (d) 115
61. The mean of 20 items is 47. Later it is found that the item 62 is wrongly written as 26. Find the correct mean :
(a) 48.8 (b) 47.7
(c) 49.9 (d) 46.6
62. The average of six numbers is 32. If each of the first three numbers is decreased by 4 and last three numbers are increased by 2, then the new average is:
(a) 35 (b) 34
(c) 31 (d) 30
63. A man bought 13 articles at Rs.70 each, 15 articles at Rs.60 each, 12 articles at 65 Rs. each then price per article is:
(a) Rs. 60.25 (b) Rs. 64.75
(c) Rs. 65.75 (d) Rs. 62.25
64. Out of four numbers, the average of the first three is 18 and that of the last three is 16. If the last number is 19, the first is:
(a) 19 (b) 18
(c) 20 (d) 25
65. If the average of x and $\frac{1}{x}$ ($x \neq 0$) is M , then the average of x^2 and $\frac{1}{x^2}$ is:
(a) $1 - M^2$ (b) $1 - 2M$
(c) $2M^2 - 1$ (d) $2M^2 + 1$
66. The average of 5 consecutive integers starting with ' m ' is n . What is the average of 6 consecutive integers starting with $(m + 2)$?
(a) $\frac{2n+5}{2}$ (b) $(n + 2)$
- (c) $(n + 3)$ (d) $\frac{2n+9}{2}$
67. A cricketer makes score of 60 runs in 10 innings. Find out how many runs are to be scored in the eleventh innings to raise the mean score to 62?
(a) 83 (b) 82
(c) 80 (d) 81
68. In a 20 over match, the required run rate to win is 7.2. If the run rate is 6 at the end of the 15th over, the required run rate to win the match is :
(a) 1.2 (b) 13.2
(c) 10.8 (d) 12
69. The average age of 4 football players is 33 years. A new player added in their group now new average becomes 33 year 6 months. After that a footballer in their group after which average age becomes 33 year 9 months. Find the average age of two new players.
(a) 35 year 4 months
(b) 33 year 3 months
(c) 35 year 9 months
(d) 35 year 3 months
70. The average weight of 8 persons is increased by 2.5kg when one of them whose weight is 56 kg is replaced by a new man. The weight of new man is :
(a) 73 kg (b) 72 kg
(c) 76 kg (d) 80 kg
71. 5 years ago, the average age of Rashmi and Surbhi was 20 years. Now the average age of Rashmi, Surbhi and Geeta is 30 years. What will be age of Geeta after 15 years ?
(a) 35 years (b) 55 years
(c) 59 years (d) 67 years
72. The average temperature of the town in the first four days of a month was 58 degrees. The average for the second, third, fourth and fifth days was 60°. If the temperature of the first and fifth days were in the ratio 7 : 8, then what is the temperature on the fifth day ?
(a) 64° (b) 62°
(c) 56° (d) 63°
73. A cricketer whose bowling average is 18 runs per wicket for 38.5 runs per wicket. If he takes 5 more wickets for 38.5 runs, his average will be reduced by 0.5 runs per wicket. The number of wickets he took till last match is :
(a) 28 (b) 38
(c) 28 (d) 38
74. A cricket player has an average score of 30 runs for 42 innings played by him. In an innings, his highest score exceeds his lowest score by 100 runs. If these two innings are excluded his average of the remaining 40 innings is 28 runs. His highest score in an innings is:
(a) 125 (b) 120
(c) 110 (d) 100
75. The average monthly salary of 660 workers in a factory is Rs.880 (approx). The average monthly salary of officers is Rs.2100 and average monthly salary of the other workers is 840. The number of other workers is:
(a) 629 (b) 639
(c) 659 (d) 649
76. After replacing old member by a new member, it was found that the average age of five members of a club is the same as it was 8 years ago. What is the difference between the ages of the replaced and the new member?
(a) 16 years (b) 24 years
(c) 84 years (d) 40 years
77. The average weight of Ajay, Brijesh and Chandan is 84 kg. Another man Digvijay joins the group and the average now becomes 80 kg. If another man Imran, whose weight is 3 kg more than that of Digvijay, replaces Ajay, then the average weight of Brijesh, Chandan, Digvijay and Imran becomes 79 kg. The weight of Ajay is:
(a) 70 kg (b) 72 kg
(c) 75 kg (d) 80 kg
78. A person runs the first $\frac{1}{4}$ th of



the distance at 8 km/hr, the next $\frac{3}{5}$ th at the 6 km/hr and the remaining distance at 10km/hr. Find his average speed : if total distance is 200 km.

- (a) 17km/hr
(b) 17.87km/hr
(c) 17.78km/hr
(d) $6\frac{98}{117}$ km/hr
79. A reached Raipur from Somgarh in 35min with an average speed of 69 km/hr. If the average speed is increased by 36 km/hr. How much time it take to cover the same distance ?
(a) 24 minute (b) 27 minute
(c) 23 minute (d) 28 minute
80. 30 oranges and 70 apples were purchased for Rs. 510. If the price per apple was Rs.3, the average price of 35 orange and 15 apple will be:
(a) Rs. 7.90 (b) Rs. 7.95
(c) Rs. 8.90 (d) Rs. 8.95
81. There were 35 students in a hostel. If the number of students is increased by 7 the expenditure of students is reduced by Rs.1. What was the initial expenditure on food per day?
(a) Rs. 400 (b) Rs. 432
(c) Rs. 442 (d) Rs. 420
82. The average per day income of A, B and C is Rs. 450. If the average per day income of A and B be Rs.400 and that of B and C be Rs.430, the per day income of B is :
(a) Rs.300 (b) Rs.310
(c) Rs.415 (d) Rs.425
83. The average marks of 32 boys of section A of class X is 60 where as the average marks of 40 boys of section B of class X is 33. The average marks for

both the sections combined together is:

- (a) 44 (b) 45
(c) $46\frac{1}{2}$ (d) $45\frac{1}{2}$
84. The batting average for 40 innings of a cricket player is 50 runs. His highest score exceeds his lowest score by 172 runs. If these two innings are excluded, the average of the remaining 38 innings is 48 runs. The highest score of the player is:
(a) 165 runs (b) 170 runs
(c) 172 runs (d) 174 runs
85. In an exam, the average marks obtained by the students was found to be 60. After omission of computational errors, the average marks of some 100 candidates had to be changed from 60 to 30 and the average with respect to all the examinees came down to 45 marks. The total number of candidates who took the exam, was:
(a) 200 (b) 210
(c) 240 (d) 180
86. The average pocket money of 3 friends A, B, C is Rs.80 in a particular month. If B spends double and C spends triple of what A spends during that month and if the average of their unspent pocket money is Rs. 60, then A spends (in Rs.)
(a) 10 (b) 20
(c) 30 (d) 40
87. The average of n numbers is 32. If three-fourth of the numbers are increased by 4 and the remaining are decreased by 6, what is the new average?
(a) 30.0
(b) 30.5
(c) 33.5
(d) can not be determined
88. In a class of 64 students, the average of the marks obtained is 88. If the top 10 students got on an average 142 marks, find the average of marks obtained by the remaining students :
(a) 80 (b) 78
(c) 74 (d) 66
89. The average score of 55 students in an examination is 88. If the scores of the top four students

are not considered, then the average of the remaining students drops by 4. If the second highest score is less than 133 and all the students had got integral scores, find the minimum possible score that could have been scored by the topper:

- (a) 160 (b) 163
(c) 166 (d) 168
90. The average age of group men is 20 years. Two men aged 22 years and 28 years join the group. As a result the average age of the group increases by a prime number of years. Find the number of men in the group:
(a) 3 (b) 4
(c) 5
(d) cannot be determined
91. A man bought 2 dozen apples at Rs. 24 per dozen and x dozen apples for Rs. 120. The average amount (per dozen) spent on the two lots was the same. Find the total number of apples with the person :
(a) 7 (b) 12
(c) 84 (d) 144
92. The average weight of N boys in a group is 30 kg. If 5 boys with an average weight of 12 kg join the group the average weight would be the same as if 5 boys with an average weight of 36 kg leave the group. Find N :
(a) 15 (b) 20
(c) 25 (d) 10
93. The average salary of 97 workers, 2 assistant managers and one senior manager is Rs. 1500. The salary of each assistant manager is Rs. 3000 and that of the senior manager is Rs. 4000. One assistant manager and the senior manager were replaced by two new people with salaries of Rs/ 3500 and Rs. 4500. Find the new average salary of all the employees:
(a) Rs. 1550 (b) Rs. 1600
(c) Rs. 1510 (d) None of these
94. In an account grove, (x + 2) trees yield 60 nuts per year per tree, x trees yield 120 nuts per year per tree and (x - 2) trees yield 180 nuts per year per tree. If the average yield per year per tree be 100, find x.
(a) 4 (b) 2
(c) 8 (d) 6



95. In a certain primary school, there are 60 boys of age 12 years each, 40 of age 13 years each, 50 of age 14 years each and 50 of age 15 years each. The average age (in years) of the boys of the school is:
(a) 13.50 (b) 13
(c) 13.45 (d) 14
96. The average age of 24 students and the class teacher is 16 years. If the class teacher's age is excluded, the average reduces by 1 year. What is the age of the class teacher?
(a) 50 years (b) 45 years
(c) 40 years (d) 80 years
97. The average of 8 numbers is 14. If 2 is subtracted from each given number. What will be the new average?
(a) 12 (b) 10
(c) 16 (d) 18
98. The average of x numbers is $3x$. If $x - 1$ is subtracted from each given number. What will be the new average?
(a) $2x + 1$
(b) $3(x - 1)$
(c) $2x - 1$
(d) Data inadequate
99. The average age of 34 boys in a class is 14 years. If the teacher's age is included the average age of the boys and the teacher becomes 15 years. What is the teacher's age?
(a) 48 years (b) 26 years
(c) 49 years (d) 45 years
100. The average of 40 numbers is 405. If each of the number is divided by 15, find the average of new set of numbers.
(a) 27 (b) 28
(c) 21 (d) 26
101. The average of 40 numbers is 21. If each of the number is multiplied by 8, find the average of the new set of numbers.
(a) 168 (b) 167
(c) 158 (d) 161
102. The average weight of 8 persons increases by 1.5 kg. If a person whose weight is 65 kg is replaced by a new person, what could be the weight of the new person?
(a) 76 kg
(b) 77 kg
(c) 76.5 kg
(d) Data inadequate
103. In a class there are 24 boys whose average age is decreased by 3 months, when 1 boy age 20 years is replaced by a new boy. Find the age of the new boy?
(a) 14 years (b) 16 years
(c) 17 years (d) 18 years
104. The average of 13 results is 39, that of the first five is 38 and that of the last seven is 36. Find the value of the 6th number.
(a) 64 (b) 46
(c) 65 (d) 56
105. A batsman in his 16th innings makes a score of 92 and thereby increases his average by 4. What is his average after 16 innings?
(a) 32 (b) 30
(c) 34 (d) 23
106. A batsman in his 19th innings makes a score of 98 run and thereby increases his average by 3. What is his average after 19 innings?
(a) 54 (b) 44
(c) 45 (d) 43
107. A constant distance from A to B is covered by a man at 40 km/hr. The person rides back the same distance at 30 km/hr. Find his average speed during the whole journey.
(a) 34 km/hr (b) 35.29 km/hr
(c) 34.5 km/hr (d) $34\frac{2}{7}$ km/hr
108. A person divides his total route of journey into three equal parts and decides to travel the three parts with speeds of 20, 15 and 10 km/hr respectively. Find his average speed during the whole journey.
(a) $13\frac{11}{13}$ km/hr
(b) $11\frac{11}{13}$ km/hr
(c) $13\frac{2}{13}$ km/hr
(d) $11\frac{3}{13}$ km/hr
109. A person covers 18 km at 6 km/hr, 16 km at 8 km/hr and 30 km at 6 km/hr. Then find the average speed in covering the whole distance.
(a) 6.5 km/hr (b) 6.4 km/hr
(c) 6.2 km/hr (d) 6 km/hr
110. The average salary of the entire staff in a office is ₹ 130 per month. The average salary of officers is ₹ 540 and that of non-officers is ₹ 114. If the number of officers is 16, then find the number of non-officers in the office.
(a) 140 (b) 410
(c) 510 (d) 150
111. The average attendance of a college for the first three days of a week is 325, and for first four days it is 320. How many were present on the fourth day?
(a) 305 (b) 350
(c) 530 (d) 503
112. A car runs for t_1 hours at v_1 km/hr, t_2 hours at v_2 km/hr. What is the average speed of the car for the entire journey?
(a) $\frac{t_1 + t_2}{v_1 + v_2}$ km/hr
(b) $\frac{v_1 t_1 + v_2 t_2}{t_1 + t_2}$ km/hr
(c) $\frac{v_1 t_2 + v_2 t_1}{v_1 + v_2}$ km/hr
(d) $\frac{v_1 + v_2}{v_1 t_1 + v_2 t_2}$ km/hr



113. A car runs x km at an average speed of v_1 km/hr and y km at an average speed of v_2 km/hr. What is the average speed of the car for the entire journey?
- (a) $\frac{v_1 v_2 (x+y)}{x v_2 + y v_1}$ km/hr
 (b) $\frac{v_1 t_1 + v_2 t_2}{t_1 + t_2}$ km/hr
 (c) $\frac{v_1 t_2 + v_2 t_1}{v_1 + v_2}$ km/hr
 (d) $\frac{v_1 + v_2}{v_1 t_1 + v_2 t_2}$ km/hr
114. The average of Suresh's marks in English and History is 55. His average marks in English and Science is 65. What is the difference between the marks which he obtained in History and Science?
- (a) 40 (b) 60
 (c) 20
 (d) Data inadequate
115. The average marks scored by Ganesh in English, Science, Mathematics and History is less by 15 from that scored by him in English, History, Geography and Mathematics. What is the difference of marks in Science and Geography, scored by him?
- (a) 40 (b) 50
 (c) 60
 (d) Data inadequate
116. The average temperature for Monday, Tuesday and Wednesday was 40°C . The average for Tuesday, Wednesday and Thursday was 41°C . That for Thursday being 42°C , what was the temperature on Monday?
- (a) 39°C (b) 45°C
 (c) 44°C (d) 40°C
117. An aeroplane covers the four times of square field at speeds 200, 400, 600 and 800 km/hr. Then the average speed of the plane in the entire journey is
- (a) 600 km/hr (b) 400 km/hr
 (c) 500 km/hr (d) 384 km/hr
118. The average age of the three boys is 15 years. Their ages are in the ratio 3 : 5 : 7. Then the age of the oldest is
- (a) 7 years (b) 14 years
 (c) 20 years (d) 21 years
119. The population of a town increased by 20% during the first year, by 25% during the next year and by 44% during the third year. Find the average rate of increase during 3 years.
- (a) 36.87% (b) 37.68%
 (c) $38\frac{2}{3}\%$ (d) 40%
120. An investor earns 3% return on $\frac{1}{4}$ th of his capital, 5% on $\frac{2}{3}$ rd and 11% on the remainder. What is the average rate of return he earns on his total capital?
- (a) 5% (b) 10%
 (c) 5.5% (d) 10.5%
121. The average age of a family of 6 members is 22 years. If the age of the youngest member be 7 years, the average age of the family at the birth of the youngest member, was
- (a) 15 years (b) 17 years
 (c) 17.5 years (d) 18 years
122. The average age of a husband and wife was 23 years. When they were married 5 years ago. The average age of the husband, the wife and a child who was born during the interval, is 20 years now. How old is the child now?
- (a) 9 months (b) 1 year
 (c) 3 years (d) 4 years
123. 5 years ago, the average age of A, B, C and D was 45. With E joining them now, the average age of all the five is 49 years. How old is E?
- (a) 25 years (b) 40 years
 (c) 45 years (d) 64 years
124. The average height of 40 students is 163 cm. On a particular day, three students A, B, C were absent and the average height of the remaining 37 students was found to be 162 cm. If A, B have equal heights and the height of C be 2 cm less than that of A, find the height of A.
- (a) 176 cm (b) 166 cm
 (c) 180 cm (d) 186 cm
125. Out of three members, the first is twice the second and is half of the third. If the average of the three numbers is 56, the three numbers in order are:
- (a) 48, 96, 24 (b) 48, 24, 96
 (c) 96, 24, 48 (d) 96, 48, 24
126. The arithmetic mean of the following numbers
 1, 2, 2, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 5, 5, 6, 6, 6, 6, 6, 6, 6 and 7, 7, 7, 7, 7, 7 is
- (a) 4 (b) 5
 (c) 14 (d) 20
127. Three Science classes A, B and C take a Life Science test. The average score of class A is 83. The average score of class B is 76. The average score of class C is 85. The average score of class A and B is 79 and average score of class B and C is 81. Then the average score of classes A, B and C is
- (a) 81.5 (b) 81
 (c) 80.5 (d) 80
128. Average of n numbers is a . The first number is increased by 2, second one is increased by 4, the third one is increased by 8 and so on. The average of the new numbers is
- (a) $a + \frac{2^{n-1} - 1}{n}$ (b) $a + \frac{2(2^n - 1)}{n}$
 (c) $a + \frac{2^{n-1}}{n}$ (d) $a + \frac{2^n - 1}{n}$
129. a, b, c, d, e, f, g are consecutive even numbers. j, k, l, m, n are consecutive odd numbers. The average of all the numbers is
- (a) $3\left(\frac{a+n}{2}\right)$ (b) $\left(\frac{l+d}{2}\right)$
 (c) $\frac{a+b+m+n}{4}$ (d) $\frac{j+c+n+g}{4}$



130. If a, b, c, d, e are five consecutive odd numbers, their average is
 (a) $5(a+4)$
 (b) $\frac{abcde}{5}$
 (c) $5(a+b+c+d+e)$
 (d) $a+4$
131. The average of 6 consecutive natural numbers is K . If the next two natural numbers are also included, how much more than K will the average of these 8 numbers be?
 (a) increase by 1.5
 (b) increase by 1
 (c) remain the same
 (d) increase by 2
132. The average of five consecutive positive integers is n . If the next two integers are also included, the average of all these integers will
 (a) increase by 1.5
 (b) increase by 1
 (c) remain the same
 (d) increase by 2
133. The average monthly expenditure of a family for the first 4 months ₹ 2570, for the next 3 months ₹ 2490 and for the last 5 months ₹ 3030. If the family saves ₹ 5320 during the whole year, the average monthly income of the family during the year is
 (a) ₹ 3000 (b) ₹ 3185
 (c) ₹ 3200 (d) ₹ 3580
134. If the arithmetic mean of $3a$ and $4b$ is greater than 50, and a is twice of b , then the smallest possible integer value of a is
 (a) 20 (b) 18
 (c) 21 (d) 19
135. In a class, the average score of girls in an examination is 73 and that of boys is 71. The average score for the whole class is 71.8. Find the percentage of girls.
 (a) 40% (b) 50%
 (c) 55% (d) 60%
136. A student finds the average of ten, 2-digit numbers. If the digits of one of the numbers is interchanged, the average increases by 3.6. The difference between the digits of the 2-digit numbers is
 (a) 4 (b) 3
 (c) 2 (d) 5
137. The average age of eleven players of a cricket team decreases by 2 months when two new players are included in the team replacing two players of age 17 years and 20 years. The average age of new player is
 (a) 17 years 1 month
 (b) 17 years 7 months
 (c) 17 years 11 months
 (d) 18 years 3 months
138. After replacing an old member by a new member, it was found that the average age of five members of a club is same as it was 3 years ago. The difference between the ages of the replaced and the new members is
 (a) 2 years (b) 4 years
 (c) 8 years (d) 15 years
139. The average monthly income of agricultural workers is 11 times that of other workers. The average monthly income of all the workers is:
 (a) $\frac{S+11T}{12}$ (b) $\frac{S+T}{12}$
 (c) $\frac{11S+T}{12}$ (d) $\frac{1}{11S} + T$
140. The average (arithmetic mean) of $3^{30}, 3^{60}$, and 3^{90} is
 (a) $3^{27}+3^{57}+3^{87}$ (b) 3^{60}
 (c) $3^{29}+3^{59}+3^{89}$ (d) 3^{177}
141. In a team of 10 persons, nine persons spent ₹ 40 each for their meals. The 10th one spends ₹ 9 more than the average expenditure of all the 10 persons. The total expenditure for their meal was
 (a) ₹ 510 (b) ₹ 310
 (c) ₹ 410 (d) ₹ 610
142. In an examination average marks obtained by the girls of a class is 85 and the average marks obtained by the boys of the same class is 87. If the girls and boys are in the ratio 4 : 5. Average marks of the whole class (approximately) is closest to
 (a) 85.9 (b) 86.1
 (c) 86.4 (d) 86.5

ANSWER KEY

1. (a)	21. (a)	41. (c)	61. (a)	81. (d)	101.(a)	121.(d)	141.(c)
2. (a)	22. (b)	42. (c)	62. (c)	82. (b)	102.(b)	122.(d)	142.(b)
3. (b)	23. (c)	43. (b)	63. (b)	83. (b)	103.(a)	123.(c)	
4. (d)	24. (b)	44. (a)	64. (d)	84. (d)	104.(c)	124.(a)	
5. (c)	25. (c)	45. (a)	65. (c)	85. (a)	105.(a)	125.(b)	
6. (a)	26. (d)	46. (b)	66. (a)	86. (a)	106.(b)	126.(d)	
7. (b)	27. (d)	47. (a)	67. (d)	87. (c)	107.(d)	127.(a)	
8. (c)	28. (b)	48. (c)	68. (c)	88. (b)	108.(a)	128.(b)	
9. (d)	29. (c)	49. (b)	69. (d)	89. (a)	109.(b)	129.(b)	
10. (a)	30. (a)	50. (b)	70. (c)	90. (a)	110.(b)	130.(d)	
11. (c)	31. (b)	51. (d)	71. (b)	91. (c)	111.(a)	131.(d)	
12. (b)	32. (c)	52. (b)	72. (a)	92. (d)	112.(b)	132.(b)	
13. (c)	33. (c)	53. (a)	73. (c)	93. (c)	113.(a)	133.(b)	
14. (d)	34. (b)	54. (c)	74. (b)	94. (a)	114.(c)	134.(c)	
15. (c)	35. (d)	55. (c)	75. (b)	95. (c)	115.(c)	135.(a)	
16. (a)	36. (c)	56. (c)	76. (d)	96. (c)	116.(a)	136.(a)	
17. (c)	37. (c)	57. (d)	77. (c)	97. (a)	117.(d)	137.(b)	
18. (d)	38. (b)	58. (b)	78. (d)	98. (a)	118.(d)	138.(d)	
19. (a)	39. (d)	59. (a)	79. (c)	99. (c)	119.(c)	139.(c)	
20. (b)	40. (c)	60. (b)	80. (a)	100.(a)	120.(a)	140.(c)	

Solution

1. (a) $S = n^2 = 13^2$
average = $n = \boxed{13}$
2. (a) $\text{sum} = \frac{n(n+1)(2n+1)}{6n}$
Average = $\frac{(n+1)(2n+1)}{6}$
 $= \frac{18 \times 35}{6} = \boxed{105}$
3. (b) 9th observation
 $= (9 \times 87) - (5 \times 79 + 3 \times 92)$
 $= 783 - (395 + 276)$
 $= 783 - 671 = \boxed{112}$
4. (d) Last two data
 $= (7 \times 34) - (3 \times 28 + 2 \times 47)$
 $= 238 - 178 = 60$
 $\therefore \text{average} = \frac{60}{2} = \boxed{30}$
5. (c) Sum (7th, 8th, 9th)
 $= (9 \times 79) - (2 \times 75 + 4 \times 87)$
 $= 711 - 498 = 213$
 $7\text{th} + 8\text{th} + 9\text{th} = 213$
 $(x-4) + (x+1) + (x)$
 $= 213$
 $\Rightarrow 3x - 3 = 213$
 $\boxed{x = 72}$
6. (a) Let 6th number = x
7th number = $x + 4$
8th number = $x + 7$
 $(6\text{th} + 7\text{th} + 8\text{th}) = 160 - (31 + 64)$
 $\underline{x + x + 4 + x + 7 = 65}$
 $x = 18$
 $\therefore 8\text{th} = x + 7 = \boxed{25}$
7. (b) $\text{Sum} = 30 \times 14 \frac{4}{12}$ or $30 \times 14 \frac{1}{3} = 30 \times \frac{43}{3} = 430$
New sum = $35 \times 13 \frac{3}{4} = \frac{35 \times 55}{4}$
Sum (excluding four)
 $= \left(430 + 9 \frac{11}{12} \right)$
8. (c) $\begin{array}{c} [1, 2, \dots, 9] \quad + [\text{Boy}] \\ \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\ 30 \quad 30 \quad 30 \quad A + \frac{72000}{9} \\ 30 \quad \underline{A + 8000} \end{array}$
 $\therefore \text{Boy} = 8000 + 30 + 72,000$
 $= \text{Rs. } 80,030$
9. (b) $\begin{array}{c} \boxed{\quad\quad\quad} \\ \downarrow 20 \\ 5 \times 3 \quad 17 \\ \downarrow \\ 15 \end{array}$
age of child = $17 - 15 = 2$ years
10. (a) $\begin{array}{c} \text{M} \quad \text{F} \quad \text{S} \quad \text{Bride} \quad \text{Baby} = 36 \\ \boxed{48} \quad \boxed{18} \end{array}$
average = $\frac{36}{2} = 18$
Bride + baby = 36
 $31y + 5y$
At time of marriage, bride
 $= 31 - 6 = 25$ years
11. (c) $\begin{array}{r} \text{M} + \text{T} + \text{W} + \text{Th} = 31 \times 4 \\ -(\text{T} + \text{W} + \text{Th} + \text{F}) = 29.5 \times 4 \\ \hline \text{M} - \text{F} = 6 \end{array}$
 $37 \frac{1}{2} \% = \frac{3}{8}$
 $\therefore \text{M} : \text{F} = 11 : 8$
 $\therefore \boxed{\text{M} = 22^\circ\text{C}, \text{F} = 16^\circ\text{C}}$
12. (b) $\begin{array}{r} \text{M} + \text{T} + \text{W} = 37 \times 3 \\ \text{T} + \text{W} + \text{Th} = 34 \times 3 \\ \hline \text{M} - \text{Th} = 9 \end{array}$
 $\frac{\text{Th}}{\text{M}} = \frac{4}{5} = \frac{36}{45}$
 $= \boxed{36^\circ\text{C}}$
13. (c) Original = $42x$
New = $55(x-3)$
 $42x + 30 = 55x - 165$
 $13x = 195 \Rightarrow x = 15$
 $\therefore \text{original} = 42 \times 15 = 630$
14. (d) Let nos. be a, b, c and d .
 $\frac{a+b+c}{3} + d = 29$
 $(a+b+c+a) + 2d = 29 \times 3$
 $(29 + 23 + 21 + 17 - 90)$
 $a+b+c+d = \frac{90}{2} = 45$
 $\therefore 45 + 2d = 87$
 $d = 21$
 $\therefore \text{other number} = \frac{23 \times 3 - 45}{2} = 12$
Other = $\frac{21 \times 3 - 45}{2} = 9$ and
Other = $\frac{17 \times 3 - 45}{2} = 3$
15. (c) $\frac{a+b}{2} + c = 24$
 $\Rightarrow a+b+2c = 24 \times 2$
 $\frac{b+c}{2} + a = 20 \Rightarrow 2a+b+c = 20 \times 2$
 $\frac{a+c}{2} + b = 18 \Rightarrow \underline{a+c+2b = 18 \times 2}$
 $4(a+b+c) = 62 \times 2$
 $a+b+c = 31$
 $\therefore c = 17, a = 9, b = 5$
16. (a) $480 \times 12 + x \times 11 = 11 \frac{3}{4}$
or
 $[\underline{480}] [\underline{\quad\quad}] \rightarrow [\text{average}]$
 $\begin{array}{cc} \text{B} & \text{G} \\ 12 & 11 \\ & \swarrow \quad \searrow \\ & 11 \frac{3}{4} \\ & \swarrow \quad \searrow \\ \frac{3}{4} & \frac{1}{4} \end{array}$
 $= 3 : 1$
 $\therefore \text{girls} = 480 \times \frac{1}{3} = 160$

$$17. (c) \frac{12.4x+52}{x+10} = (12.0)$$

$$12.4x + 52 = 12x + 120$$

$$x = 170$$

$$\text{wickets at present} = \boxed{180}$$

$$18. (d) \text{ Let average be } x$$

$$16x + 87 = 17(x + 3)$$

$$16x + 87 = 17x + 51$$

$$x = 36$$

$$\therefore \text{New average} = 36 + 3 = 39$$

$$19. (a) \text{ Runs} = 12.4x$$

$$\therefore \frac{12.4x+26}{x+5} = 12$$

$$12.4x + 26 = 12x + 60$$

$$0.4x = 34$$

$$\boxed{x = 85}$$

$$\text{Current wickets} = 85 + 5 = \boxed{90}$$

$$20. (b) \frac{43x+42+36.5+39+42.5}{(x+4)}$$

$$= 42.5$$

$$43x + 160 = 42.5x + 170$$

$$\Rightarrow 0.5x = 10 \Rightarrow x = 20$$

$$\text{therefore, number of students} = \boxed{24}$$

$$21. (a) 30 \times 42 = 1260$$

$$28 \times 40 = 1120$$

$$\therefore \text{highest} + \text{lowest} = 140$$

$$\frac{120}{20}$$

$$\text{highest} - \text{lowest} = 100$$

$$\text{Highest score} = \frac{140+100}{2}$$

$$= 120$$

$$22. (b) \text{ The average of last 2 Innings.}$$

$$= \frac{3.95 \times 6 - [(3.4 \times 2) + (3.85 \times 2)]}{2} = 4.6$$

$$23. (c) \text{ Let the averages of 16th innings} = x$$

$$\text{Let the average after 15th innings} = x - 3$$

$$16x = 15(x - 3) + 60$$

$$x = 15$$

$$24. (b)$$

$$\frac{n + (n+1) + (n+2) + (n+3) + (n+4)}{5} = m$$

$$n+2=m \Rightarrow n = m-2$$

$$\text{Series is } m-2, m-1, m, m+1, m+2, m+3, m+4, m+5$$

$$\text{Average}$$

$$= \frac{(m-2) + (m-1) + \dots + (m+4) + [m+5]}{8}$$

$$= m + 1.5$$

$$\text{Which is 1.5 more than } m$$

$$25. (c) x + (x - 12) + 117 + 15 = 72.5 \times 4$$

$$2x = 290 - 117 - 15 + 12 = 170$$

$$x = 85$$

$$26. (d) x + x + 2 + x + 4 + x + 6 + x + 8 + x + 10 + x + 12 + x + 14 + x + 16 = 9 \times 53$$

$$\Rightarrow 9x + 72 = 477$$

$$\Rightarrow 9x = 477 - 72 = 405$$

$$\Rightarrow x = \frac{405}{9} = 45$$

$$27. (b) \text{ Total no. of odd no. from 1 to } 100 = 50$$

$$\text{Required average} = 50$$

$$28. (b) x + x + 1 + x + 2 + x + 3 + x + 4 + x + 5 + x + 6 = 26 \times 7$$

$$\Rightarrow 7x = 182 - 21 = 161$$

$$\Rightarrow x = \frac{161}{7} = 23$$

$$29. (c) \text{ Total no. of workers in factory} = \frac{1534}{118} = 13$$

$$30. (a) \text{ Correct total number 10 numbers}$$

$$50 \times 10 - 64 + 48 = 482$$

$$\text{average} = \frac{482}{10} = 48.2$$

$$31. (b) \text{ Required average}$$

$$= \frac{x_1 + x_2 + \dots + x_{20}}{3} - \frac{101 \times 20}{20} = y - 101$$

$$32. (c) \text{ Difference of numbers}$$

$$= 82 - 28 = 54$$

$$\text{Required average}$$

$$= 60 + \frac{54}{27} = 62$$

$$33. (c) \text{ difference} = 97 - 79 = 18$$

$$\text{original average} = 75 + \frac{18}{20} = 75.9$$

$$34. (b) \text{ Let 7 consecutive numbers is:}$$

$$x + x + 1 + x + 2 + x + 3 + x + 4 + x + 5 + x + 6 = 20 \times 7$$

$$7x + 21 = 140$$

$$x = 17,$$

$$\text{largest numbers } x + 6 = 117 + 6 = 123$$

$$35. (d) \text{ Let's the 1st no is } x$$

$$\therefore x + 3 + x + 4 = 2 \times 6$$

$$\Rightarrow 2x + 7 = 12$$

$$\Rightarrow 2x = 5 \Rightarrow x = \frac{5}{2}$$

$$\therefore x + (x + 1) + \dots + (x + 7) = 8x + 28$$

$$= 8 \times \frac{5}{2} + 28 = 20 + 28 = 48$$

$$36. (c) \text{ Difference} = 31 - 17 = 14$$

$$\therefore \text{Required average}$$

$$= 18 + \frac{14}{7} = 20$$

$$37. (c) 4C = 22 \times 4 - 20 \times 4$$

$$= 88 - 80 = 8$$

$$\Rightarrow C = \frac{8}{4} = 2$$

$$38. (b) 6^{\text{th}} \text{ no. is} = 6 \times 32 + 6 \times 37 - 11 \times 35$$

$$= 192 + 222 - 385 = 29$$

$$39. (d) \text{ weight of new man}$$

$$= 60 + 8 \times \frac{3}{2}$$

$$= 60 + 12 = 72 \text{ kg}$$

$$40. (c) \text{ Average of first five odd multiples of 3}$$

$$\Rightarrow \frac{3(1+3+5+7+9)}{5} = \frac{3 \times 25}{5} = 15$$

$$41. (c) \text{ sum} = \text{average} \times \text{total observations}$$

$$Sx = y^2 \times x = xy^2$$

$$Sy = x^2 \times y = x^2y$$

$$Sx + Sy = xy^2 + x^2y = xy(x + y)$$

$$\text{Average} = \frac{xy(x+y)}{x+y} = xy$$

42. (c)

$$a = x, b = x + 2, c = x + 4, d = x + 6, e = x + 8, f = x + 10, g = x + 12$$

Average =

$$\frac{x + x + 2 + x + 4 + x + 6 + x + 8 + x + 10 + x + 12}{7}$$

$$= x + 6$$

$$\text{i.e. } = a + 6$$

43. (b) uses of petrol in 1st year

$$= \frac{12000}{60} = 200 \text{ litre.}$$

uses of petrol in 2nd year

$$= \frac{12000}{80} = 150 \text{ litre}$$

uses of petrol in 3rd year

$$= \frac{12000}{48} = 250 \text{ litre}$$

average cost

$$= \frac{12000 \times 3}{200 + 150 + 250} = \text{Rs.60}$$

44. (a) $40 \times 40 - 38 \times 38$

$$= 1600 - 1444 = 156$$

Sum of these 2 innings = 156

$$\text{i.e. } x + x + 56 = 156$$

$$2x = 100$$

$$x = 50$$

Highest score = $50 + 56 = 106$

45. (a) Let the average of 10th innings

= x , then

$$= \frac{10x + 158}{11} = x + 10$$

$$10x + 158 = 11x + 110, x = 48$$

$$\text{New average} = 48 + 10 = 58$$

46. (b) Let the average in 11th innings = x The average of after 12th match

$$= x - 5$$

$$12(x - 5) = 11x + 90$$

$$x = 150$$

$$\text{Hence, New average} = 150 - 5 = 145$$

47. (a) 20 orange of = 60

$$\text{then } 60 \text{ orange of} = 180$$

$$30 \text{ orange of} = 60$$

$$\text{then, } 60 \text{ orange of} = 120$$

Average

$$= \frac{180 + 120}{60 + 60} = \frac{300}{120} = \text{Rs.2.5}$$

48. (c) Let the workers in the workshop = x

Then,

$$8500 \times x = 1000 \times 7 + 7800(x - 7)$$

$$8500 \times x - 7800 \times x = 1000 \times 7 - 7800 \times 7$$

$$700x = 2200 \times 7$$

$$x = 22$$

49. (b) Average cost

$$= \frac{13 \times 50 + 15 \times 60 + 12 \times 65 + 20 \times 16}{13 + 15 + 12 + 20}$$

$$= \frac{650 + 900 + 780 + 320}{60}$$

$$= \text{Rs.} 44 \frac{1}{6}$$

50. (b) Average speed

$$= \frac{2 \times 10 \times 15}{10 + 15} = 12 \text{ km/hr}$$

51. (d) Average speed

$$= \frac{1 + 1 + 1}{\frac{1}{20} + \frac{1}{15} + \frac{1}{12}} = \frac{3 \times 60}{3 + 4 + 5}$$

$$= 15 \text{ km/h}$$

52. (b) Age of wicket keeper

$$= 11 \times 30 - [(5 \times 28) + 5 \times 29.5]$$

$$= 42.5 \text{ year}$$

53. (a) Let the all 19th Numbers average is = x

Then,

$$19x = 13 \times 79 + 6(x + 4)$$

$$\text{i.e. } 13x = 1027 + 24$$

$$x = 80.84$$

$$\text{Total expenditure} = 19x$$

$$= 1536.07$$

54. (c) Let of trucks initially planned = x

$$\text{Efficiency of each trucks} = \frac{60}{x}$$

$$\text{Original efficiency} = \frac{60}{x} - 0.5$$

According to the question,

$$= \left[\frac{60}{x} - 0.5 \right] = \frac{60}{x + 4}$$

go throw options

 $x = 20$ Put the value

$$\frac{60}{20} - 0.5 = \frac{60}{20 + 4}$$

55. (c) Let the cricketer average of 8 innings runs = x

According to the question,

$$\frac{8x + 100}{9} = x + 9$$

$$\Rightarrow 8x + 100 = 9x + 81$$

$$\Rightarrow x = 100 - 81 = 19$$

$$\therefore \text{The average of new runs} = 19 + 9 = 28$$

56. (c) Total correct marks

$$= 100 \times 40 - 83 + 53 = 3970$$

 $\therefore$ Correct average marks

$$= \frac{3970}{100} = 39.70$$

57. (d) Difference in water

$$= 87 - 78 = 9 \text{ kg}$$

 $\therefore$ Correct average weight

$$= 89.4 + \frac{9}{20} = 89.85 \text{ kg}$$

58. (b) Let the average runs score in 11th innings x

$$\therefore 10 \times 50 + x = 11 \times 52$$

$$\Rightarrow 500 + x = 572$$

$$\Rightarrow x = 572 - 500 = 72 \text{ runs}$$

59. (a) Difference of no. = $64 - 46 = 18$

$$\text{Net average} = 50 - \frac{18}{10}$$

$$= 50 - 1.8 = 48.2$$

60. (b) According to the question,

$$195 + x + x + 20 = 135 \times 3$$

$$\Rightarrow 2x + 215 = 405$$

$$\Rightarrow 2x = 405 - 215 = 190$$

$$\therefore x = \frac{190}{2} = 95 = \text{Small no.}$$

61. (a) difference = $62 - 26 = 36$

$$\therefore \text{Required average} = 47 + \frac{36}{20} \\ = 47 + 1.8 = 48.8$$

62. (c) Change = $2 \times 3 - 3 \times 4 = -6$

$$\text{New average} = 32 - \frac{6}{6} = 31$$

63. (b) Required average cost

$$= \frac{13 \times 70 + 15 \times 60 + 12 \times 65}{13 + 15 + 12}$$

$$= \frac{910 + 900 + 780}{40} = \frac{2590}{40} \\ = \text{Rs. } 64.75$$

64. (d) $a + b + c = 18 \times 3 = 54$

and, $b + c + d = 16 \times 3 = 48$

$$\therefore a + b + c - b - c - d$$

$$= 54 - 48 = 6$$

$$\Rightarrow a - d = 6$$

$$\Rightarrow a - 19 = 6$$

$$\Rightarrow a = 19 + 6 = 25$$

65. (c) $\frac{x + \frac{1}{x}}{2} = M \Rightarrow x + \frac{1}{x} = 2M$

Required average

$$= \frac{x^2 + \frac{1}{x^2}}{2} = \frac{\left(x + \frac{1}{x}\right)^2 - 2}{2}$$

$$= \frac{4M^2 - 2}{2} = 2M^2 - 1$$

66. (a) $m + m + 1 + m + 2 + m + 3 + m + 4 = 5n$

$$\Rightarrow 5m + 10 = 5n$$

$$\Rightarrow m + 2 = n \quad \dots\dots(i)$$

Average

$$= \frac{m + 2 + m + 3 + m + 4 + m + 5 + m + 6 + m + 7}{6}$$

$$= \frac{6m + 27}{6} = \frac{2m + 9}{2} = \frac{2(n - 2) + 9}{2}$$

$$= \frac{2n + 5}{2}$$

67. (b) Required runs = $60 + 11 \times 2$
= 82 run

68. (c) Total run = $20 \times 7.2 = 144$

$$\text{Total run in 15 overs} = 15 \times 60 = 90$$

Score made in next 5 overs

$$= 144 - 90 = 54$$

$$\therefore \text{Required runrate} = \frac{54}{5} = 10.8$$

69. (d) Age of 5th players

$$= 33 \frac{6}{12} + 4 \left(33 \frac{6}{12} - 33 \right)$$

$$= 35 \frac{1}{2} \text{ years}$$

Age of 6th Player

$$= 33 \frac{9}{12} + 5 \left(33 \frac{9}{12} - 33 \frac{6}{12} \right)$$

$$= 35 \text{ years}$$

Average age of 2 new players

$$= \frac{35 \frac{1}{2} + 35}{2} = 35 \frac{1}{4} \text{ years}$$

$$= 35 \text{ years } 3 \text{ months}$$

70. (c) The age of new candidate

$$= 56 + 8 \times 2.5$$

$$= 76 \text{ kg}$$

71. (b) Total age of Surbhi and Rashmi is (before 5 year)

$$= 20 \times 2 = 40 \text{ years}$$

Total age of Surbhi and Rashmi is (in present)

$$= 40 + 5 + 5 = 50 \text{ years}$$

in present age of geeta's

$$= 3 \times 30 - 50 = 40 \text{ years}$$

after 15 years age of geeta's will be

$$40 + 15 = 55 \text{ years}$$

72. (a) $\frac{\text{first} + \text{second} + \text{third} + \text{fourth} + \text{fifth}}{5}$

The sum of 1st day Temperature

$$= 58 \times 4 = 232$$

The sum of 1st and 5th days temperature = 240

The difference of 1st and 5th days temperature = 8°

According to the question,

First Fifth Diff.

$$7 : 8 \quad 1$$

$$\downarrow \times 8 \quad \downarrow \times 8 \quad \downarrow \times 8$$

$$56 : 64 \quad 8$$

The temperature of 5th days = 64°

73. (c) Let the number of wicket in last match x

$$\text{then, } \frac{11.125x + 38.5}{x + 7} = 10$$

$$11.125x + 38.5 = 10x + 70$$

$$1.125x = 31.5$$

$$x = 28$$

74. (b) Let the minimum score of the cricketer x ,

$\therefore$ Let the maximum score of the cricketer = $x + 100$

$$\therefore x + x + 100 = 30 \times 42 - 40 \times 28$$

$$2x + 100 = 1260 - 1120 = 140$$

$$x = 20$$

$\therefore$ The score of one innings of the cricketer = 120

75. (b) Total salary = 660×880
= 580800

If number of other workers = x then,

$$580800 = 2100(660 - x)$$

$$+ 840 \times x$$

$$2100x - 840x = 138600$$

$$- 580800$$

$$1260x = 805200$$

$$x = 639$$

76. (d) Let the average of present age = x

Before 8 years average age

$$= x - 8$$

Then,

$$5(x - 8) = 5(x) + \text{The age of new person} - \text{old person age}$$

$$\text{Difference of age} = 5x - 5x + 40 = 40 \text{ years}$$

77. (c) Let A, B, C, D and E repressed their respective weights.

Then,

$$(A + B + C) = (84 \times 3) = 252 \text{ kg}$$

$$A + B + C + D = (80 \times 4) = 320 \text{ kg}$$

$$D = (320 - 252) = 68 \text{ kg}$$

$$E = (68 + 3) = 71 \text{ kg}$$

Then,

$$B + C + D + E = (79 \times 4) = 316 \text{ kg}$$

$$(A + B + C + D) - (B + C + D + E) = 320 - 316$$

$$A - E = 4 \text{ kg. } A = E + 4$$

$$A = 71 + 4 = 75 \text{ kg}$$

78. (d) Distance Speed

$$200 \times \frac{1}{4} = 50 \quad 8 \text{ km/hr}$$

$$200 \times \frac{3}{5} = 120 \quad 6 \text{ km/hr}$$

Remaining distance 10 km/hr

$$200 - (120 + 50) = 30 \text{ km}$$

Now, Required average speed

$$= \frac{50 + 120 + 30}{\frac{50}{8} + \frac{120}{6} + \frac{30}{10}} = \frac{200}{29\frac{1}{4}}$$

$$= \frac{200 \times 4}{117} = 6\frac{98}{117} \text{ km/hr}$$

79. (c) Distance between Raipur and Somgarh

$$= \frac{69 \times 35}{60} = \frac{161}{4} \text{ km}$$

$$\text{New Average speed} = (69 + 36) = 105 \text{ km/h}$$

$$\text{speed} = \frac{\text{Distance}}{\text{Time}} = \frac{161}{4 \times 105} = \frac{161 \times 60}{4 \times 105} \text{ min} = 23 \text{ min}$$

80. (a) Average price of orange

$$= \frac{510 - 70 \times 3}{30} = 10 \text{ Rs.}$$

$$\text{Price of 35 orange and 15 apple} = 35 \times 10 + 15 \times 3 = 395 \text{ Rs.}$$

Average price of 35 orange and 15 apple

$$= \frac{395}{50} = 7.9 \text{ Rs.}$$

81. (d) Suppose the initial expenditure per day = Rs. x

$$= \frac{x}{35} - \frac{x+42}{42} = 1$$

$$\Rightarrow \frac{6x - 5x - 210}{210} = 1$$

$$\Rightarrow x = 210 + 210 = \text{Rs. } 420$$

82. (b) Total daily income of A, B and C = $3 \times 450 = \text{Rs. } 1350$

$$\text{Total daily income of A and B} = 2 \times 400 = \text{Rs. } 800$$

$$\text{Total daily income of B and C} = 2 \times 430 = \text{Rs. } 860$$

$$\therefore \text{B's daily income} = \text{Rs. } (800 + 860 - 1350) = \text{Rs. } 310$$

83. (b) Required average

$$= \frac{32 \times 60 + 33 \times 40}{72} = \frac{1920 + 1320}{72} = \frac{3240}{72} = 45$$

84. (d) Let the highest score be x .

$$\therefore \text{Lowest score} = x - 172$$

$$\therefore x + x - 172 = 40 \times 50 - 38 \times 48$$

$$\Rightarrow 2x = 176 + 172 = 348$$

$$\therefore x = \frac{348}{2} = 174$$

85. (a) If the number of candidates be x , then

$$60x - 45x = 30 \times 100$$

$$\Rightarrow 15x = 3000$$

$$\Rightarrow x = 200$$

86. (a) $A + B + C = 3 \times 80 = \text{Rs. } 240$

$$\text{The money spent} = 240 - 180 = 60$$

$$\text{Let the A spends } x, \text{ B spends } 2x \text{ and C spends } 3x$$

$$x + 2x + 3x = 60$$

$$\Rightarrow 6x = 60$$

$$\Rightarrow x = \text{Rs. } 10$$

$$\text{Hence, A spends Rs. } 10$$

87. (c) let there are 4 numbers

$$\text{if we add 4 in } 3 \left(\frac{3}{4} \text{ of no.} \right)$$

The average will increase by

$$= \frac{12}{4} = 3$$

$$\text{So new avg} = 32 + 3 = 35$$

but by decreasing 6×1

the avg will come down by

$$= \frac{6}{4} = 1.5$$

$$\text{So avg will be} = 35 - 1.5 = 33.5$$

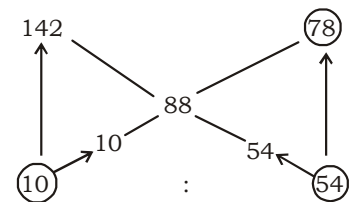
88. (b) Sum of numbers of all the students = $88 \times 64 = 5632$

$$\text{Sum of 10 students} = 142 \times 10 = 1420$$

Avg of remaining students

$$= \frac{(5632 - 1420)}{54} = \frac{4212}{54} = 78$$

Alternative:



So avg = 78

89. (a) we can see that those four students have avg $(88 - 4) +$

$$\frac{55 \times 4}{4}$$

$$\text{That is equals to} = 84 + 55 = 139$$

$$\text{Sum of their scores} = 139 \times 4 = 556$$

for minimum score

$$= 556 - (133 + 132 + 131)$$

$$\text{minimum score of topper} = 160$$

90. (a) Avg of group = 20

$$\text{Avg of two new men} = \frac{22 + 28}{2}$$

$$= 25$$

2 men have 10 years more than the avg.

because the avg. increasing by a prime number and the no. of men in the group can not be in fraction

$$\text{So } 1 \text{ ————— } 2 \times 5$$

avg will increase by 2

and so no. of men in the group was = 3

91. (c) because the avg is same that is 24

$$\text{So he has } \frac{120}{24} = 5 \text{ dozen}$$

and 2 dozen before total apples
 $= 7 \times 12 = 84$

92. (d) boys = N

then sum of their weight = 30N
 according to que.

$$\frac{30N+60}{N+5} = \frac{30N-180}{N-5}$$

$$= 30N^2 + 60N - 150N - 300 = 30N^2 + 150N - 180N - 900 - 90N - 300 = -30N - 900$$

$$60N = 600$$

$$N = 10$$

93. (c) Total employees = 100

Sum of the salary of assistant manager and the senior manager = 3000 + 4000 = 7000

Sum of the that of two new men
 $= 3500 + 4500 = 8000$

new avg of the employees

$$= \left(\frac{8000 - 7000}{100} \right)$$

$$= 1500 + 10 = 1510$$

94. (a) According to the question

$$= \frac{60(x+2)+120x+180(x-2)}{x+2+x+x-2} = 100$$

$$= 360x+120-360 = 300x$$

$$60x = 240$$

$$x = 4 \text{ ans.}$$

95. (c) Required average age

$$= \frac{60 \times 12 + 40 \times 13 + 50 \times 14 + 50 \times 15}{60 + 40 + 50 + 50}$$

$$= \frac{720+520+700+750}{200} = \frac{2690}{200}$$

$$= 13.45 \text{ ans.}$$

96. (c) The class teacher's age

$$= 25 \times 16 - 24 \times 15$$

$$400 - 360 = 40 \text{ years}$$

97. (a) Required New average = old average - 2

$$= 14 - 2 = 12 \text{ ans.}$$

98. (a) Required New Average = old Average - (x - 1)

$$= 3x - x + 1$$

$$= 2x + 1$$

99. (c) The Teacher's age = $35 \times 15 - 34 \times 14$

$$= 525 - 476$$

$$= 49 \text{ years. ans.}$$

100. (a) Required New average = old Average $\div 15$

$$= 405 \div 15$$

$$= 27 \text{ Ans.}$$

101. (a) Required New Average = old Average $\times 8$

$$= 21 \times 8$$

$$= 168 \text{ ans.}$$

102. (b) Required weight of the New Person

$$= 65 + (8 \times 1.5)$$

$$= 65 + 12 = 77 \text{ ans.}$$

103. (a) Required age of the New boy
 $\Rightarrow 20 \text{ years} - (24 \times 3) \text{ months}$

$$\Rightarrow 20 \text{ years} - 6 \text{ years}$$

$$= 14 \text{ years ans}$$

104. (c) The Required average of 6th Result

$$= 39 \times 13 - 38 \times 5 - 36 \times 7$$

$$= 507 - 442 = 65 \text{ ans.}$$

105. (a) Suppose the average run after 15th inning was "A"
 According to the question

$$\frac{15A+92}{16} = A+4$$

$$15A+92 = 16A+64$$

$$A = 28$$

Average run after 16th inning
 $= 28 + 4 = 32 \text{ ans.}$

106. (b) Suppose the average run after 18th innings was A

According to the question

$$= \frac{18A+98}{19} = A + 3$$

$$= 18A + 98 = 19A + 57$$

$$A = 41$$

$\therefore$ The Required Average

$$= 41 + 3 = 44 \text{ ans.}$$

107. (d) Average speed = $\frac{2xy}{x+y}$

$$= \frac{2 \times 30 \times 40}{70} = 34 \frac{2}{7} \text{ km/hr}$$

Alternate:-

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

$$\frac{240}{\frac{120}{40} + \frac{120}{30}} = \frac{240}{7} = 34 \frac{2}{7} \text{ km/hr}$$

108. (a) LCM of 20, 15 and 10 = 60 km

Average speed

$$= \frac{\text{Total Distance}}{\text{Total Time}} = \frac{60+60+60}{\frac{60}{20} + \frac{60}{15} + \frac{60}{10}}$$

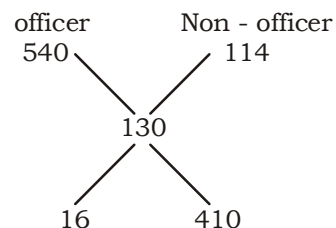
$$= \frac{180}{13} = 13 \frac{11}{13} \text{ km/h ans.}$$

109. (b) Required Average speed

$$= \frac{18+16+30}{\frac{18}{6} + \frac{16}{8} + \frac{30}{6}}$$

$$= \frac{64}{10} = 6.4 \text{ km/hr}$$

110. (b) According to the question



therefore, no. of non-officers = 410

111. (a) The Attendance on 4th day

$$= (320 \times 4) - (325 \times 3)$$

$$= 1280 - 975 = 305$$

112. (b) Average speed

$$= \frac{\text{Total Distance}}{\text{Total Time}}$$

$$= \frac{v_1 t_1 + v_2 t_2}{t_1 + t_2} \text{ Ans.}$$

113. (a) According to the question

Average speed

$$= \frac{\text{Total Distance}}{\text{Total Time}} \Rightarrow \frac{x+y}{\frac{x}{V_1} + \frac{y}{V_2}}$$

$$\Rightarrow \frac{v_1 v_2 (x+y)}{v_2 x + v_1 y} \text{ Ans.}$$

114. (c) Marks obtained by Suresh in
English + History = $55 \times 2 = 110$
English + Science = $65 \times 2 = 130$
Science - History = **20**

115. (c) According to the question

$$\frac{(E+H+G+M)}{4} - \frac{(E+S+M+H)}{4} = 15$$

$$E + H + G + M - E - S - M - H = 60$$

$$G - S = \mathbf{60 \text{ Ans.}}$$

116. (a) According to the question

$$\text{Mon.} + \text{Tue.} + \text{Wed.} = 40 \times 3 = 120 \dots\dots\dots(i)$$

$$\text{Tue.} + \text{Wed.} + \text{Thu.} = 41 \times 3 = 123^\circ\text{C} \dots\dots(ii)$$

by (ii-i)

$$\text{Thu} - \text{Mon.} = 123 - 120 = 3^\circ\text{C}$$

$$\text{Monday} = \text{Thus} - 3^\circ\text{C} = 42^\circ - 3^\circ\text{C} = \mathbf{39^\circ\text{C \text{ Ans.}}}$$

117. (d) LCM of, 200, 400, 600 or 800 = 2400

According to the question
Average Speed

$$= \frac{\text{Total Distance}}{\text{Total Time}}$$

$$= \frac{2400 \times 4}{\frac{2400}{200} + \frac{2400}{400} + \frac{2400}{600} + \frac{2400}{800}}$$

$$= \frac{9600}{25} = 384 \text{ km/hr.}$$

118. (d) Required age of oldest boy

$$= \frac{7 \times 15 \times 3}{3+5+7} = \frac{315}{15} = 21 \text{ years}$$

119. (c) Suppose the initial population was 100.

After three years population would be

$$100 \times \frac{120}{100} \times \frac{125}{100} \times \frac{144}{100} = 216$$

Hence, overall percentage increase in population during the three years

$$216 - 100 = 116\%$$

Now, the average rate of increase

$$= \frac{116}{3} = 38\frac{2}{3}\%$$

120. (a) Suppose total capital is Rs. 1200.

Parts of Capital	Rate	Return
I. $\frac{1}{4} \times 1200 = 300$	3%	₹ 9
II. $\frac{2}{3} \times 1200 = 800$	5%	₹ 40
III. Remaining = 100	11%	₹ $\frac{11}{60}$

Hence, rate of return

$$= \frac{60}{1200} \times 100 = 5 \text{ i.e. } 5\%$$

121. (d) Total age of 6 members of the Family

$$22 \times 6 = 132 \text{ years}$$

Seven years before the sum of the ages of family members was = $132 - (7 \times 6) = 90 \text{ years}$

Required Average age

$$= \frac{90}{5} = 18 \text{ years}$$

122. (d) Present average age of husband and wife is $(23 + 5) = 28 \text{ years}$

Sum of the ages of husband and wife is $28 \times 2 = 56 \text{ years}$

Sum of the ages of husband, wife and child = $20 \times 3 = 60 \text{ years}$

Child's age = $60 - 56 = 4 \text{ years}$

123. (c) At Present, Average age of A, B, C and D is = $45 + 5 = 50 \text{ years}$

Sum of the ages of A, B, C and D is = $50 \times 4 = 200 \text{ years}$

Sum of the ages of A, B, C, D and E is = $49 \times 5 = 245 \text{ years}$

Now, E's age = $245 - 200$

$$= 45 \text{ years}$$

124. (a) Total height of 40 students

$$163 \times 40 = 6520 \text{ cm}$$

Sum of height of A, B and C is

$$= 6520 - (37 \times 162)$$

$$= 6520 - 5994 = 526$$

According to the question

Height of B = Height of A

Height of C = Height of A - 2 cm

We know

$$A + B + C = 526 \text{ cm}^2$$

$$A + A + A - 2 = 526$$

$$3A = 528$$

$$A = 176 \text{ cm}$$

125. (b) Suppose the numbers are P_1, P_2 , and P_3

$$2 : 1 : 4$$

$$\text{Given } P_1 + P_2 + P_3 = 56 \times 3 = 168$$

$$P_1 = \frac{2}{7} \times 168 = 48$$

$$P_2 = \frac{1}{7} \times 168 = 24$$

$$P_3 = \frac{4}{7} \times 168 = 96$$

126. (d) given 1,2,2, 3,3,3, 4,4,4,4, 5,5,5,5,5, 6,6,6,6,6,6 and 7,7,7,7,7,7,7

$$= 1^2 + 2^2 + 3^2 + 4^2 + 5^2 + 6^2 + 7^2$$

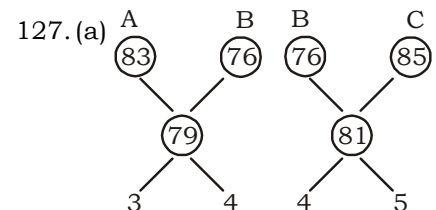
$$\therefore S_n = \frac{n(2n+1)(n+1)}{6}$$

$$\therefore = \frac{7(14+1)(7+1)}{6} = \frac{7 \times 15 \times 8}{6}$$

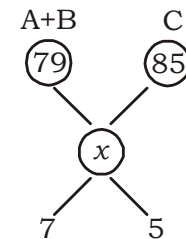
$$= 140$$

$\therefore$ Average of Required no.

$$= \frac{140}{7} = 20$$



$$\therefore A : B : C = 3 : 4 : 5$$



$\therefore$ Average of A, B & C

$$= \frac{79 \times 7 + 85 \times 5}{12} = \frac{553 + 425}{12}$$

$$= \frac{978}{12} = 81.5$$

128.(b) Let the number are

$$x_1, x_2, x_3 \dots x_n$$

$$\therefore a = \frac{x_1 + x_2 + x_3 \dots x_n}{n}$$

Required Average

$$= \frac{(x_1 + 2) + (x_2 + 4) + (x_3 + 8) \dots (x_n + 2n)}{n}$$

$$= \frac{(x_1 + x_2 + x_3 \dots x_n)}{n} + \frac{2 + 4 + 8 \dots 2n}{n}$$

$$= a + \frac{2(1 + 2 + 4 + 8 \dots n)}{n}$$

$$\left(\because S_n = \frac{a(r^n - 1)}{r - 1} \right)$$

$$= \frac{2(2^n - 1)}{2 - 1} = 2(2^n - 1)$$

New Average

$$= \frac{na + 2(2^n - 1)}{n} = a + \frac{2(2^n - 1)}{n}$$

129.(b) average of even numbers = d

average of odd number = l

$$\therefore \text{Avg. of all numbers} = \frac{l + d}{2}$$

130.(d) Let $a = n + 2$

$$b = n + 4$$

$$c = n + 6$$

$$d = n + 8$$

$$e = n + 10$$

Now Required average

$$= \frac{n + 2 + n + 4 + n + 6 + n + 8 + n + 10}{5}$$

$$= \frac{5n + 30}{5} = n + 6$$

$$= (n + 2) + 4 \quad (\text{Here } n + 2 = a)$$

$$= a + 4$$

131.(d) Let the no. are, $x, x + 1, x + 2, x + 3, x + 4, x + 5$

$$k = \frac{x + (x + 1) + (x + 2) + (x + 3) + (x + 4) + (x + 5)}{6}$$

$$= \frac{6x + 15}{6}$$

$$k = \frac{2x + 5}{2} \quad \dots (i)$$

When next two natural numbers are added

New average

$$= \frac{x + (x + 1) + (x + 2) + (x + 3) + (x + 4) + (x + 5) + (x + 6) + (x + 7)}{8}$$

$$= \frac{8x + 28}{8} = \frac{2x + 7}{2}$$

$$= \frac{2x + 5 + 2}{2} = \frac{2x + 5}{2} + 1 = k + 1$$

Hence, Required answer = 1

132.(b) Let five numbers are $x, x + 1, x + 2, x + 2, x + 3, x + 4$

$$\therefore n = \frac{x + (x + 1) + (x + 2) + (x + 3) + (x + 4)}{5}$$

$$= \frac{5x + 10}{5} = x + 2$$

when next two integers are added,

New average

$$= \frac{x + (x + 1) + (x + 2) + (x + 3) + (x + 4) + (x + 5) + (x + 6)}{7}$$

$$= \frac{7x + 21}{7} = x + 3 = n + 1$$

(Here $n = x + 2$)

Hence Required answer = 1

133.(b) Total exp. = $2570 \times 4 + 3 \times 2490 + 5 \times 3030$

$$= 10280 + 7470 + 15150$$

$$= 32900$$

Total saving = 5320

Total Income = $32900 + 5320$

$$= 38220$$

$$\therefore \text{Average income} = \frac{38220}{12}$$

$$= ₹ 3185$$

$$134.(c) \therefore \frac{3a + 4b}{2} > 50$$

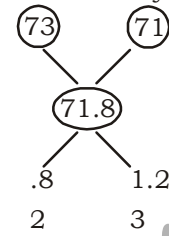
$$\& \frac{3a + 4 \times a/2}{2} > 50 \quad \left[\begin{array}{l} a = 2b \\ b = \frac{a}{2} \end{array} \right]$$

$$\Rightarrow \frac{3a + 2a}{2} > 50$$

$$\Rightarrow \frac{5a}{2} > 50 \Rightarrow a > 20$$

 $\therefore$ Required Answer = 21

135.(a) Girls Boys



$$\therefore \% \text{ of girls} = \frac{2}{5} \times 100 = 40\%$$

136.(a) Difference in number

$$= 10 \times 3.6 = 36$$

Let 2-digit number = $10x + y$
when it is interchanged then
number = $10y + x$

According to Question,

$$10y + x - (10x + y) = 36$$

$$9(y - x) = 36$$

$$y - x = 4$$

137.(b) Total age of replaced players

$$= 17 + 20 = 37 \text{ years}$$

Decreased age = 2 month $\times$ 11
= 22 month.

$$= 1 \text{ year } 10 \text{ months}$$

 $\therefore$ Average of new player

$$= \frac{37 - 1 \text{ year } 10 \text{ month}}{2}$$

$$= 17 \text{ years } 7 \text{ months}$$

138.(d) Increase in ages of Five

members in 3 years = 3×5

$$= 15 \text{ years}$$

 $\therefore$ Difference between the age
of Replaced & new members =
15 years.139.(c) Let the number of other
workers = x $\therefore$ Number of agriculture
workers = $11x$ Monthly income of agriculture
= $11x \times S$ Monthly income of other
workers = $T \times x$ $\therefore$ Monthly avg of all the worker

$$= \frac{11xS + Tx}{12x} = \frac{11S + T}{12}$$

140. (c) Required average

$$= \frac{3^{30} + 3^{60} + 3^{90}}{3}$$

$$= \frac{3^{30}(1 + 3^{30} + 3^{60})}{3}$$

$$= 3^{29} + 3^{59} + 3^{89}$$

141. (c) Let the expenditure of 10th

person = x

Expenditure of 9 persons

$$= 9 \times 40 = ₹ 360$$

According to the question,

$$x - \frac{360 + x}{10} = 9$$

$$10x - 360 - x = 90$$

$$9x = 450$$

$$\therefore x = 50$$

$\therefore$ Total expenditure

$$= 360 + 50$$

$$= ₹ 410$$

142. (b) Boys Girls

(87) (85)

x

5

4

$$\therefore \frac{87 \times 5 + 85 \times 4}{9} = x$$

$$\Rightarrow 9x = 435 + 340$$

$$\Rightarrow x = \frac{775}{9} = 86.1$$



09

TIME AND WORK

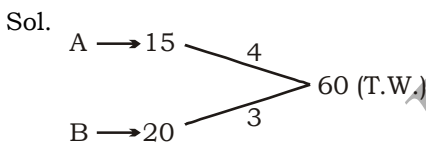
The work is directly proportional to time. As one can say if a particular person works for more time then, more work will be done and if he devotes less time, then Less work will be done. Person is directly proportional to time, provided that he/she maintains his/her efficiency during the work.

CONCEPT OF EFFICIENCY:-

Suppose a person can complete a particular work in 2 days, then we can say that each day he does half of the work or 50% work each day. Thus it is clear that his efficiency is 50% per day.

EXAMPLES

1. A can do a job in 15 days and B can do the same job in 20 days, in how many days working together they can complete the job?



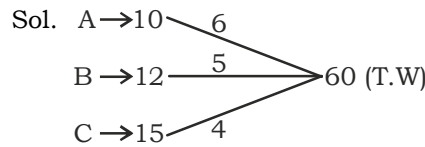
Note: To find the total work we take L.C.M of A and B's time. From total work and time we calculate the per day efficiency/ work of A and B.

A's 1 day work = 4
B's 1 day work = 3

$$\therefore (A + B)'s \text{ 1 day work} = (4 + 3) = 7$$

$$\therefore \text{Time taken by both to finish the total work} = \frac{60}{7} = 8\frac{4}{7} \text{ days}$$

2. A can do a piece of work in 10 days, B can do it in 12 days and C can do the same work in 15 days. In how many days A, B and C can complete the whole work working together?



A's 1 day work = 6

B's 1 day work = 5

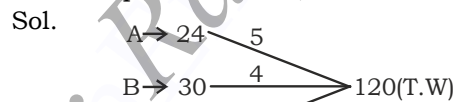
C's 1 day work = 4

(A+B+C)'s 1 day work = (6+5+4) = 15

$\therefore$ Time taken by (A+B+C) to finish

$$\text{the total work} = \frac{60}{15} = 4 \text{ days}$$

3. A can do a piece of work in 24 days, while B can do it in 30 days. With the help of C they can finish the whole work in 12 days. How much time is required by C to complete the work, alone ?



A+B+C $\rightarrow$ 12 $\frac{10}{120}$

A's 1 day work = 5

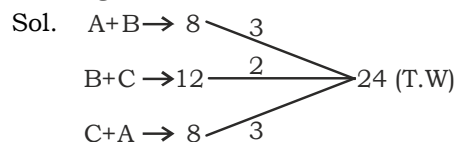
B's 1 day work = 4

(A + B + C)'s 1 day work = 10

$\therefore$ C's 1 day work = 10 - 4 - 5 = 1

$\therefore$ Time taken by C to finish the total work = $\frac{120}{1} = 120$ days

4. A and B can do a piece of work in 8 days, B and C can do the same work in 12 days and A and C complete it in 8 days. In how many days A, B and C complete the whole work working together ?

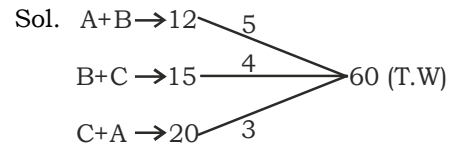


$\therefore$ 1 day work of [(A+B)+(B+C) + (C+A)] = 3 + 2 + 3 = 8

$\therefore$ 1 day work of [2(A+B+C)] = 8
and, 1 day work of (A+B+C) = $\frac{8}{2} = 4$

Then time taken by (A+B+C) to finish the total work = $\frac{24}{4} = 6$ days

5. A and B can do a piece of work in 12 days. B and C in 15 days, C and A in 20 days. In how many days can C alone do it?



$\therefore$ 1 day work of [(A+B)+(B+C) + (C+A)] = 5 + 4 + 3 = 12

$\therefore$ 1 day work of [2(A+B+C)] = 12

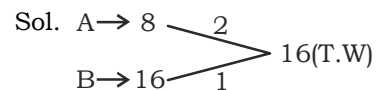
$\therefore$ 1 day work of (A+B+C)'s = $\frac{12}{2} = 6$

1 day work of (A+B) = 5

1 day work of C = 6 - 5 = 1

$\therefore$ Time taken by C to finish the total work = $\frac{60}{1} = 60$ days

6. A takes 8 days to finish a job alone, while B takes 16 days to finish the same job. What is the ratio of their efficiency and who is less efficient?



A's 1 day work/efficiency = 2

B's 1 day work/efficiency = 1

Ratio of efficiency of A:B = 2: 1

Hence, A is twice efficient as B.

7. A is thrice efficient as B and A takes 20 days to do a job, then in how many days B can finish the same job ?



Sol. Ratio of efficiency of A:B=3:1

∴ Ratio of time of A and B
= A:B=1:3

$$\text{Because efficiency} \propto \frac{1}{\text{time}}$$

A	B
Efficiency → 3	1
Time → 1	3
↓ ×20	↓ ×20
20 days (Given)	60 days

So B will take 60 days to finish the same job.

8. A is thrice as efficient as B and therefore able to finish a piece of work in 60 days less than B. Find the time in which A and B can complete the work individually.

Sol. Efficiency of A : B = 3 : 1
Time of A : B = 1 : 3

$$\text{Efficiency} \propto \frac{1}{\text{time}}$$

A	B
Efficiency → 3	1
Time → 1	3
2 units difference	

2 units → 60 days

1 unit → $\frac{60}{2} = 30$ days

3 units → $30 \times 3 = 90$ days

∴ Time taken by A to complete the work 1 unit = 30 days
and, Time taken by B to complete the work = 3 units = 90 days

9. A is twice as good as B and therefore able to finish a piece of work in 30 days less than B. In how many days they can complete the whole work, working together?

Sol. Ratio of Efficiency of A:B = 2:1
Ratio of Time of A:B = 1:2

A	B
Efficiency → 2	1
Time → 1	2
1 unit difference	

1 unit → 30 days

2 units → $30 \times 2 = 60$ days

∴ A can complete the whole work = 30 days

B can complete the whole work in = 60 days.

A → 30	2
B → 60	1
60(T.W)	

(A+B)'s 1 day work = (2+1) = 3

(A+B) can complete the whole work = $\frac{60}{3} = 20$ days.

10. A can do a work in x days while B can do the same work in y days then in how many days will they complete the whole work, working together?

A → x	y
B → y	x
xy(T.W)	

A's 1 day work = $\frac{1}{y}$

B's 1 day work = $\frac{1}{x}$

(A+B)'s 1 day work = $\frac{1}{x} + \frac{1}{y}$

(A+B) complete the whole work

= $\left(\frac{xy}{x+y} \right)$ days.

11. Unnati can do a piece of work in 20 days. Pragati is 25% more efficient than unnati. The number of days taken by Pragati to do the same piece of work is:

$$\text{Sol. Efficiency} \propto \frac{1}{\text{time}} \left[\because 25\% = \frac{1}{4} \right]$$

Unnati	Pragati
Efficiency → 4	5
Time → 5	4
↓ ×4	↓ ×4
20 days (Given)	16 days

Therefore, number of days taken by Pragati to do the same work = 16 days

12. A can complete a work in 10 days, B in 12 days and C in 15 days. All they began the work together but A had to leave the work after 2 days of the starting and B leave 3 days before the completion of the work. How long did the work last?

A → 10	6
B → 12	5
C → 15	4
60(T.W)	

A's 1 day work = 6

B's 1 day work = 5

C's 1 day work = 4

(A+B+C)'s 1 day's work = 15

Initial	Last
2 days	3 days

A+B+C	B+C	C
2×15 = 30	18	4×3 = 12
work	work	work

Thus, the remaining work '18'

completed by B + C in = $\frac{18}{9} = 2$ days

So, the total number of required days = 2+2+3 = 7 days

13. A can finish a work in 12 days and B can do it in 15 days. After A had worked for 3 days, B also joined A to finish the remaining work. Remaining work will be finished in how many days?

A → 12	5
B → 15	4
60(T.W)	

A's 1 day work = 5

B's 1 day work = 4

(A+B)'s 1 day work = (5+4) = 9

Initial	3 days
A	A+B

5×3 = 15	45
work	work

Thus, the remaining work

complete by (A+B) = $\frac{45}{9} = 5$ day

Remaining work completed in = 5 days

14. Sonu can do a piece of work in 20 days. He started the work and left after some days, when 25% work was done. After it Abhijeet joined and completed work in 10 days. In how many days Sonu and Abhijeet can complete the whole work.



Sol. Let the total work = 20 units

∴ Sonu 1 day work = 1 unit

5 units	15 units
Sonu	Abhijeet

25% of total work = 5 units

Abhijeet's 1 day work = $\frac{15}{10}$
= 1.5 Units

(Sonu + Abhijeet)'s 1 day work

= 1.5 + 1 = 2.5 units

Total time required (Sonu + Abhijeet) to complete the whole

work = $\frac{20}{2.5} = 8$ days

15. A alone can complete a work in 16 days and B alone in 12 days. Starting with A, they work on alternate days. The total work will be completed in how many days?

Sol. $A \rightarrow 16 \xrightarrow{3}$
 $B \rightarrow 12 \xrightarrow{4}$ 48 (total work)

A's 1 day work = 3

B's 1 day work = 4

(Now A come and work for 1 day = 3

B Come and work for 1 day = 4

In 2 days (A+B) work = 4+3 = 7

Time	Work
2	7
$\times 6$	$\times 6$
12 days	42 work

Now A comes $\frac{+1}{13}$ days $\frac{+3}{45}$

Now B comes $\frac{+3}{4}$ days $\frac{+3}{45}$
13 $\frac{3}{4}$ days 48 (total work)

Total time required to complete

the work = $13\frac{3}{4}$ days

16. A does $\frac{4}{5}$ of a work in 20 days. He then calls in B and they together finish the remaining work in 3 days. How long B alone would take to do the whole work?

Sol. A does $\frac{4}{5}$ of a work in = 20 days

A completes whole work in

= $20 \times \frac{5}{4} = 25$ days

(A+B) does $\frac{1}{5}$ of a work in = 3 days

(A + B) complete whole work in

= $3 \times 5 = 15$ days

$A \rightarrow 25 \xrightarrow{3}$
 $A+B \rightarrow 15 \xrightarrow{5}$ 75(T.W)

A's 1 day work = 3

(A+B)'s 1 day work = 5

B's 1 day work = $5 - 3 = 2$

Time required to complete the whole work by 'B'

= $\frac{75}{2} = 37\frac{1}{2}$ days

17. Two workers A and B are engaged to do a piece of work. A working alone would take 8 hours more to complete the work than they working together. If B worked alone, he would take $4\frac{1}{2}$ hours more than when work together. The time required to finish the work together is?

Sol. $A \rightarrow 8 \text{ (hours more)}$
 $A+B \rightarrow B \rightarrow 4\frac{1}{2} \text{ (hours more)}$

In this type of question we use this formula to calculate time required to finish the work together

(A+B) time =

$$\sqrt{A(\text{time more}) \times B(\text{time more})}$$

$$(A+B) = \sqrt{8 \times \frac{9}{2}}$$

$$(A+B) = \sqrt{36}$$

$$(A+B) = 6 \text{ hours}$$

18. 8 men can do a piece of work in 5 days. How many men are needed to complete the work in 10 days?
- (a) 8 men (b) 4 men
(c) 2 men (d) 3 men

Sol. (b) According to the question,
 $m_1 \times d_1 = m_2 \times d_2 = 8 \times 5 = 10 \times m_2$
 $= m_2 = 4$ men

19. 20 men can prepare 40 toys in 24 days working 18 hours a day. Then in how many days can 36 men prepare 48 toys working 16 hours a day?

(a) 16 days (b) 12 days

(c) 21 days (d) 18 days

Sol. (d) According to the question,

$$\frac{m_1 d_1 h_1}{w_1} = \frac{m_2 d_2 h_2}{w_2}$$

$$\frac{20 \times 24 \times 18}{40} = \frac{36 \times 16 \times d_2}{48}$$

$$\frac{20 \times 24 \times 18 \times 48}{40 \times 36 \times 16} = 18 \text{ days}$$

20. A and B can finish a piece of work in 30 days, B and C in 40 days while C and A in 60 days. How long will they take to finish it together?

(a) $26\frac{2}{3}$ days

(b) $16\frac{2}{3}$ days

(c) 25 days

(d) 24 days

Sol. (a) According to the question,

$A+B \rightarrow 30 \text{ days} \xrightarrow{4}$
 $B+C \rightarrow 40 \text{ days} \xrightarrow{3}$ 120 (Total work)
 $C+A \rightarrow 60 \text{ days} \xrightarrow{2}$

$$\text{Total efficiency } (A+B+C) = \frac{9}{2}$$

A + B + C together will Complete the whole work

$$= \frac{120 \times 2}{9} = 26\frac{2}{3} \text{ days}$$

21. A, B and C can do a piece of work in 10, 12 and 15 days respectively, they start working together but C leaves after working for 3 days and B, 4 days before the completion of the work. In how many days the work was finished?

(a) $6\frac{2}{11}$ days (b) 7 days

(c) $7\frac{2}{15}$ days (d) $6\frac{2}{5}$ days



Sol. (a) $\begin{array}{l} A \rightarrow 10 \text{ days} \\ B \rightarrow 12 \text{ days} \\ C \rightarrow 15 \text{ days} \end{array} \begin{array}{l} 6 \\ 5 \\ 4 \end{array} \rightarrow 60 \text{ (Total work)}$

Work done by C in 3 days

$$= 3 \times 4 = 12$$

$$\text{remaining work} = 60 - 12 = 48$$

$$\text{work done by B in 4 days} = 4 \times 5 = 20$$

$$\text{If we add the work B} = 48 + 20 = 68 \text{ days}$$

This 68 unit of work is done by A and B.

Total days to complete the work

$$= \frac{68}{11} = 6 \frac{2}{11} \text{ days}$$

22. 30 men, working 4 hours a day can do a piece of work in 10 days. Find the number of days in which 45 men working 8 hrs a day can do twice the work. Assume that 2 men of the first group do as much work in 2 hour as 4 men of the second group do in 1 hour.

(a) $6 \frac{1}{3}$ days (b) $6 \frac{2}{3}$ days

(c) $5 \frac{3}{6}$ days (d) $3 \frac{1}{6}$ days

Sol. (b) Ist Group : IInd Group
 $2 \times 2 : 4 \times 1$
 $1 : 1$

So, the Efficiency of men of both the group is same.

According to the question

$$\frac{m_1 \times h_1 \times d_1}{w_1} = \frac{m_2 \times h_2 \times d_2}{w_2}$$

$$\frac{30 \times 4 \times 10}{1} = \frac{45 \times 8 \times d_2}{2}$$

$$d_2 = \frac{30 \times 2 \times 4 \times 10}{45 \times 8}$$

$$d_2 = 6 \frac{2}{3} \text{ days}$$

23. A, B and C together can do a work in 4 days. A alone can do the work in 12 days and B alone can do the same work in 18 days. Find in what time C alone can do that work?

(a) 8 days (b) 27 days
 (c) 9 days (d) 18 days

Sol. (c) $\begin{array}{l} A+B+C \rightarrow 4 \text{ days} \\ A \rightarrow 12 \text{ days} \\ B \rightarrow 18 \text{ days} \end{array} \begin{array}{l} 9 \\ 3 \\ 2 \end{array} \rightarrow 36 \text{ (Total work)}$
 C's efficiency = 4

$$\text{C completes the whole work} = \frac{36}{4} = 9 \text{ days}$$

24. A, B and C together can do a work in 12 days. A alone can do the work in 36 days and B alone can do the same work in 54 days. Find in what time C alone can do that work?

(a) 9 days (b) 18 days
 (c) 24 days (d) 27 days

Sol. (d) $\begin{array}{l} A+B+C \rightarrow 12 \text{ days} \\ A \rightarrow 36 \text{ days} \\ B \rightarrow 54 \text{ days} \end{array} \begin{array}{l} 9 \\ 3 \\ 2 \end{array} \rightarrow 108 \text{ (Total work)}$
 C's efficiency = 4

$$\text{C Completes the whole work in} = \frac{108}{4} = 27 \text{ days}$$

25. A can complete a work in 35 days and B can do the same work in 28 days. If A after doing 10 days, leaves the work, find in how many days B will do the remaining work?

(a) 25 days (b) 20 days
 (c) 27 days (d) 24 days

Sol. (b) $\begin{array}{l} A \rightarrow 35 \text{ days} \\ B \rightarrow 28 \text{ days} \end{array} \begin{array}{l} 4 \\ 5 \end{array} \rightarrow 140 \text{ (Total work)}$

$$\text{work done by A} = 4 \times 10 = 40$$

$$\text{Remaining work} = (140 - 40) = 100$$

therefore, work will be done by B

$$\text{in} = \frac{100}{5} = 20 \text{ days}$$

26. A can complete a work in 24 days and B can do the same work in 18 days. If A after doing 4 days, leaves the work, find in how many days B will do the remaining work?

(a) 10 days (b) 12 days
 (c) 15 days (d) 16 days

Sol. (c) $\begin{array}{l} A = 24 \text{ days} \\ B = 18 \text{ days} \end{array} \begin{array}{l} 3 \\ 4 \end{array} \rightarrow 72 \text{ (Total work)}$

$$\text{Work done by A in 4 days} = 3 \times 4 = 12$$

$$\text{Remaining work} = 72 - 12 = 60$$

$$\text{Now B will do it in} = \frac{60}{4} = 15 \text{ days}$$

27. A and B together can do a piece of work in 10 days. A alone can do it in 30 days. The time in which B alone can do it is.

(a) 10 days (b) 12 days
 (c) 15 days (d) 20 days

Sol. (c) $\begin{array}{l} 30 \text{ (Total work)} \\ 3 \quad 1 \\ \swarrow \quad \searrow \\ \text{Time } 10 \quad 30 \\ (A+B) \quad (A) \end{array}$

$$A + B - A = B's \text{ efficiency}$$

$$2 = B's \text{ efficiency}$$

$$B \text{ alone can do it in} = \frac{30}{2} = 15 \text{ days}$$

28. A man, a women and a boy can complete a piece of work in 20 days, 30 days and 60 days respectively. How many boys must assist 2 men and 8 women so as to complete the work in 2 days?

(a) 8 (b) 12
 (c) 4 (d) 6

Sol. (a) $\begin{array}{l} 60 \text{ (Total work)} \\ \text{efficiency } 3 \quad 2 \quad 1 \text{ unit/day} \\ \swarrow \quad \downarrow \quad \searrow \\ 20 \quad 30 \quad 60 \\ \text{days} \rightarrow (1 \text{ man}) (1 \text{ women}) (1 \text{ boy}) \end{array}$
 (2 men and 8 women)'s one day work

$$= [(2 \times 3) + (8 \times 2)]$$

$$= 6 + 16 = 22 \text{ units}$$

$$\text{In 2 days (2 men + 8 women) will do} = 44 \text{ units}$$

$$\text{remaining work } 60 - 44 = 16 \text{ units will be completed by boys in 2 days.}$$

So, 8 units of work will be done by boys in 1 day and one boy does one unit/days. So 8 boys are required to do 8 units.

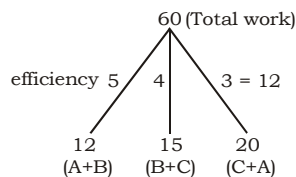
Therefore, number of boys required = 8



29. If A and B together can complete a piece of work in 12 days, B and C together in 15 days and C and A together in 20 days, then B alone can complete the work in

- (a) 30 days (b) 25 days
(c) 24 days (d) 20 days

Sol. (d)



$$2(A + B + C) = 12 \text{ units/day}$$

$$A + B + C = 6 \text{ units/day}$$

$$(A + C) \text{ complete } 3 \text{ units/day}$$

$$B's \text{ one day work} = 3 \text{ units.}$$

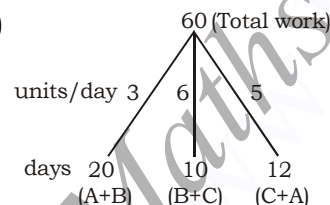
$$B \text{ will complete whole work in}$$

$$= \frac{60}{3} = 20 \text{ days}$$

30. If A and B together can finish a piece of work in 20 days. B and C in 10 days and C and A in 12 days, then A, B, C jointly can finish the same work in

- (a) $4\frac{2}{7}$ days (b) 30 days
(c) $8\frac{4}{7}$ days (d) $\frac{7}{60}$ days

Sol. (c)



$$2(A + B + C) = 14 \text{ units/day}$$

$$A + B + C = 7 \text{ units/day}$$

$$(A + B + C) \text{ will complete the}$$

$$\text{whole work in} = \frac{60}{7} = 8\frac{4}{7} \text{ days}$$

31. If P men working p hours per day for P days produce P units of work, then the units of work produced by n men working n hours a day for n days is

- (a) $\frac{p^2}{n^2}$ (b) $\frac{p^3}{n^2}$
(c) $\frac{n^2}{p^2}$ (d) $\frac{n^3}{p^2}$

Sol. (d) (Applying formula) let work done by 'n' men be W units

$$\frac{P_{\text{men}} \times P_{\text{hours}} \times P_{\text{days}}}{P_{\text{units}}} = \frac{n_{\text{men}} \times n_{\text{hours}} \times n_{\text{days}}}{W_{\text{units}}}$$

$$P^2 = \frac{n^3}{w} = W = \frac{n^3}{p^2}$$

32. X alone can complete a piece of work in 40 days. He worked for 8 days and left. Y alone completed the remaining work in 16 days. How long would X and Y together take to complete the work?

- (a) $13\frac{1}{3}$ days (b) 14 days
(c) 15 days (d) $16\frac{2}{3}$ days

Sol. (a) Let the work be 40 units

$$\text{Total work } 40 \xrightarrow{1 \text{ units/day}} 40 \text{ days (X)}$$

$$X's \text{ 1 day work} = 1 \text{ unit}$$

$$X's \text{ 8 days work is } (8 \times 1) = 8 \text{ units.}$$

$$\text{remaining Work} = 40 - 8 = 32 \text{ units}$$

According to question

Y completed the remaining work in 16 days.

$$Y's \text{ one day work} = 2 \text{ units}$$

$$X's \text{ one day work} = 1 \text{ unit}$$

(X + Y) and complete the whole

$$\text{work together in} = \frac{40}{2+1}$$

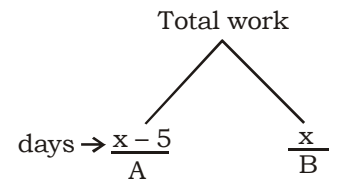
$$= 13\frac{1}{3} \text{ days}$$

33. A can do a piece of work in 5 days less than the time taken by B to do it. If both of them together take

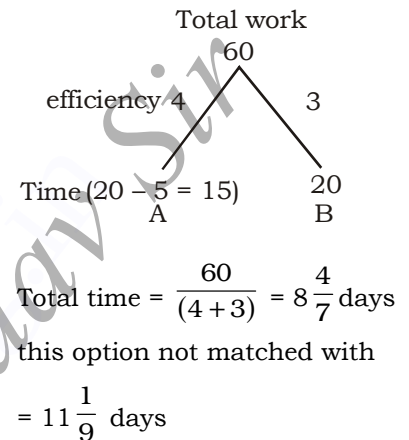
$11\frac{1}{9}$ days, then the time taken by 'B' alone to do the same work (in days) is

- (a) 15 days (b) 20 days
(c) 25 days (d) 30 days

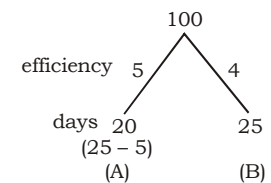
Sol. (c) Always, try to do these questions with the help of options to save time.



Now take option 'B' i.e. x = 20



take options 'C' x = 25



$$\text{Total time} = \frac{100}{5+4} = 11\frac{1}{9}$$

Hence, option (c) is correct

34. Dinesh and Rakesh are working on an Assignment, Dinesh takes 6 hours to type 32 pages on a computer, while Rakesh takes 5 hours to type 40 pages. How much time will they take while working together on two different computers to type an assignment of 110 pages?

- (a) 7 hrs, 30 min
(b) 8 hrs,
(c) 8 hrs, 15 min
(d) 8 hrs, 25 min

Sol. (c) Dinesh's one hr. work

$$= \frac{32}{6} = \frac{16}{3} \text{ pages/hr}$$

Rakesh's one hr. work

$$= \frac{40}{5} = 8 \text{ pages/hr}$$

Dinesh's and Rakesh's one hr.

$$\text{work} = \frac{16}{3} + 8 = \frac{40}{3} \text{ pages/hr}$$



They will finish the work to

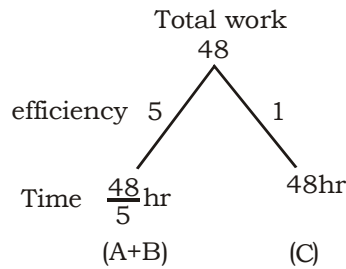
$$\text{gether} = \frac{\text{Total work}}{\text{efficiency}} = \frac{110}{\frac{40}{3}}$$

$$= 8\frac{1}{4} = 8 \text{ hrs. } 15 \text{ min}$$

35. A can do as much work as B and C together can do. A and B can together do a piece of work in 9 hours 36 minutes and C can do it in 48 hours. The time (in hours) that B needs to do the work alone, is:

- (a) 18 hrs
(b) 24 hrs
(c) 30 hrs
(d) 12 hrs

Sol. (b) According to the question,



(A + B + C)'s efficiency = 6 units/day

According to the question,

A should do half of the work alone as another half work is done by B and C together.

$$\text{So, A's efficiency} = \frac{6}{2} = 3 \text{ units}$$

$$\text{B's efficiency} = 6 - 3 - 1 = 2 \text{ units}$$

B will complete whole work in

$$= \frac{48}{2} = 24 \text{ hrs}$$

36. A, B and C can do a piece of work in 16, 32 and 48 days respectively, they start working together but C leaves after working 4 days and B, 2 days before the completion of the work. Find in how many days the work was finished?

- (a) 5 (b) 10
(c) 12 (d) $10\frac{4}{9}$

Sol. (d)

A's efficiency = 6 units
B's efficiency = 3 units
C's efficiency = 2 units
C's 4 days work = $2 \times 4 = 8$ units
Remaining work = $96 - 8 = 88$ units
Now,
If we add the work of B = $88 + 3 \times 2 = 94$ units
This 94 units of work is done by A & B
 $\therefore$ Total no. of days = $\frac{94}{9} = 10\frac{4}{9}$ days





Exercise

1. A can do a piece of work in 7 days and B can do the same work in 7 days. In how many days working together will they do the same work?
(a) 7 (b) 14
(c) $\frac{7}{4}$ (d) $\frac{7}{2}$
2. X can do a piece of work in 30 days and Y can do in 20 days. In how many days they work together to finish the same work?
(a) 15 (b) 10
(c) 12 (d) 8
3. P can do the work in 15 days and Q can do the same work in 30 days. In how many days they work together to finish the same work?
(a) 5 (b) 10
(c) $\frac{7}{2}$ (d) 20
4. A can do a piece of work in 23 days and B in 29 days. In how many days they work together to finish the work?
(a) $12\frac{1}{13}$ (b) $10\frac{17}{29}$
(c) $10\frac{2}{23}$ (d) $12\frac{43}{52}$
5. Ram can finish a work in 30 days and Vijay in 60 days. In how many days they work together will do the same work?
(a) 20 (b) 10
(c) 15 (d) 25
6. Aman can do a work in 8 days and Shyam in 10 days. In how many days they, work together will do the double work?
(a) 5 (b) $\frac{40}{9}$
(c) 4 (d) $\frac{80}{9}$
7. A can do the work in 50 days, B in 30 days. How many days they work together to finish the whole work?
(a) 6 (b) $18\frac{3}{4}$
(c) 12 (d) 25
8. X can do a work in 18 days and Y in 36 days. How many days they work together to complete the Two-Third work?
(a) 4 (b) 12
(c) 8 (d) 9
9. Ashish can do a work in 25 days and Rohit in 75 days. How many days they work together to complete the Two-fifth work?
(a) 20 (b) $\frac{15}{2}$
(c) $\frac{75}{4}$ (d) $\frac{15}{4}$
10. A can do the work in 60 days and B in 90 days. How many days they work together to complete the four times the total work?
(a) 36 (b) 72
(c) 144 (d) 18
11. A, B and C can complete a piece of work in 12, 15 and 20 days respectively. How many days they work together to complete the same work?
(a) 10 days (b) 6 days
(c) 5 days (d) 9 days
12. P, Q, R and S can complete a piece of work in 20, 30, 15, 45 hours respectively. How many hours they work together to complete the work?
(a) $10\frac{2}{7}$ hours (b) 25 hours
(c) $\frac{180}{29}$ hours (d) $\frac{180}{31}$ hours
13. Ram, Shyam and Ankit can complete a piece of work in 7 days, 9 days and 19 days respectively. In how many days they work together to complete the work?
- (a) $4\frac{91}{367}$ (b) $8\frac{96}{367}$
(c) $3\frac{96}{367}$ (d) $3\frac{95}{367}$
14. Shakshi, Priyanka and Pragati working separately can do a piece of work in 9, 12 and 36 hours respectively. If they work together they will complete the 60% of the work in how many days?
(a) $\frac{21}{10}$ (b) $\frac{27}{10}$
(c) $\frac{11}{10}$ (d) $\frac{37}{10}$
15. Naveen, Ashish and Mohit can do a certain Job in 17, 19 and 21 days respectively. If they work together they will complete the work in?
(a) $10\frac{777}{1079}$ days
(b) $6\frac{304}{1079}$ days
(c) $6\frac{16}{1079}$ days
(d) $5\frac{362}{1079}$ days
16. Rakesh, Ashok and Raju can do a piece of work in 30, 45 and 60 days respectively. Working together, In how many days they will complete the Two-fifth work?
(a) 15 (b) $\frac{180}{31}$
(c) $\frac{72}{13}$ (d) $\frac{90}{31}$
17. A tyre has two Punctures. The first Puncture alone would have made the tyre flat in 9 minutes and second alone would have done it in 12 minutes. If air leaks out at a constant rate, how long it takes both the Punctures together to make it flat?



- (a) $5\frac{6}{7}$ minutes (b) $5\frac{2}{7}$ minutes
(c) $5\frac{1}{7}$ minutes (d) 6 minutes
18. Ankit can do $\frac{1}{3}$ of a piece of work in 5 days, Vinod do $\frac{3}{5}$ of the same work in 15 days and Chetan can do $\frac{6}{7}$ of that work in 18 days. In how many days three of them working together will complete the work?
(a) $\frac{131}{21}$ (b) $\frac{129}{28}$
(c) $\frac{175}{27}$ (d) $\frac{128}{27}$
19. A man can do a piece of work in 5 days, but with the help of his son, he can do it in 3 days. In what time can the son do it alone?
(a) $6\frac{1}{2}$ days (b) 7
(c) $7\frac{1}{2}$ days (d) 8 days
20. A can lay railway track between two given stations in 16 days, B can do same job in 12 days. With the help of C, they did the job in 4 days only. Then, C alone can do the job in?
(a) $9\frac{1}{5}$ days (b) $9\frac{2}{5}$ days
(c) $9\frac{3}{5}$ days (d) 10 days
21. A takes twice as much time as B or thrice as much time C to finish a piece of work. Working together, they can finish the work in 2 days. B can do the work alone in:
(a) 4 days (b) 6 days
(c) 8 days (d) 12 days
22. X can do $\frac{1}{4}$ of the work in 10 days, Y can do 40% of the work in 40 days and Z can do $\frac{1}{3}$ of the work in 13 days. Who will complete the work first?
(a) X (b) Y
(c) Z (d) X and Z both
23. P, Q and R are three typists who working simultaneously can type 216 pages in 4 hours. In one hour, R can type as many pages more than Q as Q can type more than P. During a period of five hours, R can type as many pages as P can during seven hours. How many pages does each of them type per hour?
(a) 14, 17, 20 (b) 15, 17, 22
(c) 15, 18, 21 (d) 16, 18, 22
24. Elan and Ronald working on an assignment. Ronald takes 6 hours to type 32 pages on a computer, while Elan takes 5 hours to type 40 pages. How much time will they take, working together on two different computers to type an assignment of 110 pages?
(a) 7 hours 30 minutes
(b) 8 hours
(c) 8 hours 15 minutes
(d) 8 hours 25 minutes
25. Two workers A and B are engaged to do a work. A working alone takes 8 hours more to complete the job than if both worked together. If B worked alone, he would need $4\frac{1}{2}$ hours more to complete the job than they both working together. What time would they take to do the work together?
(a) 4 hours (b) 5 hours
(c) 6 hours (d) 7 hours
26. P can complete a work in 12 days working 8 hours a day. Q can complete the same work in 8 days working 10 hours a day. If both P and Q work together, working 8 hours a day, in how many days can they complete the work?
(a) $5\frac{5}{11}$ (b) $5\frac{6}{11}$
(c) $6\frac{5}{11}$ (d) $6\frac{6}{11}$
27. A and B can do work in 12 day, B and C in 15 days, C and A in 20 days. If A and B work for 5 days and remaining work is done by B and C. In how many days the work will complete.
(a) 15 days (b) $13\frac{3}{4}$
(c) 10 days (d) $15\frac{2}{3}$ days
28. A and B can do a work in 8 days, B and C can do the same work in 12 days. A, B and C together can finish it in 6 days. A and C together will do it in:
(a) 4 days (b) 6 days
(c) 8 days (d) 12 days
29. A and B can do a piece of work in 72 days, B and C can do it in 120 days; A and C can do it in 90 days. In what time can A alone do it?
(a) 80 days (b) 100 days
(c) 120 days (d) 150 days
30. A and B can do a piece of work in 5 days; B and C can do it in 7 days; A and C can do it in 4 days. Who among these will take the least time if put to do it alone?
(a) A (b) B
(c) C
(d) Data inadequate
31. A can do a certain work in the same time in which B and C together can do it. If A and B together could do it in 10 days and C alone in 50 days, then B alone could do it in;
(a) 15 days (b) 20 days
(c) 25 days (d) 30 days
32. A works twice as fast as B. If B can complete a work in 12 days independently, the number of days in which A and B can together finish the work is;
(a) 4 days (b) 6 days
(c) 8 days (d) 18 days



33. A is thrice as good a workman as B and therefore is able to finish a job in 60 days less than B. Working together, they can do it in?
(a) 20 days (b) $22\frac{1}{2}$ days
(c) 25 days (d) 30 days
34. A and B can do a job together in 7 days. A is $2\frac{1}{3}$ times as efficient as B. The same job can be done by A alone in;
(a) $9\frac{1}{3}$ days (b) 11 days
(c) $12\frac{1}{4}$ days (d) $16\frac{1}{3}$ days
35. A does half as much work as B in three-fourth of the time. If together they take 18 days to complete the work, how much time shall B take to do it?
(a) 30 days
(b) 35 days
(c) 40 days
(d) None of these
36. Ashish is more 50% efficient than Manoj. Chetan does half of the work done by Ashish and Manoj together. If Chetan alone does the work in 40 days, then Ashish, Manoj and Chetan together can do the work?
(a) $13\frac{1}{3}$ (b) 15
(c) 20 (d) 30
37. Two workers A and B working together completed a job in 5 days. If A worked twice as efficiently as he actually did and B worked $\frac{1}{3}$ as efficiently as he actually did, the work would have been completed in 3 days. A alone could complete the work in?
(a) 15/4 (b) 4
(c) 18/4 (d) 25/4
38. A can do a work in 15 days and B in 20 days. If they work on it together for 4 days, then the fraction of the work that is left is?
(a) $\frac{1}{4}$ (b) $\frac{1}{10}$
(c) $\frac{7}{15}$ (d) $\frac{8}{15}$
39. A can finish a work in 18 days and B can do the same work in 15 days. B worked for 10 days and left the job. In how many days A alone can finish the remaining work?
(a) 5 (b) $5\frac{1}{2}$
(c) 6 (d) 8
40. A and B can complete a work in 15 days and 10 days respectively. They started doing the work together but after 2 days B had to leave and A alone completed the remaining work. The whole work was completed in;
(a) 8 days (b) 10 days
(c) 12 days (d) 15 days
41. A can finish a work in 24 days, B in 9 days and C in 12 days. B and C start the work but they forced to leave after 3 days. The remaining work was done by A in?
(a) 5 days (b) 6 days
(c) 10 days (d) $10\frac{1}{2}$ days
42. A machine P can print one lakh books in 8 hours, machine Q can print the same number of books in 10 hours while machine R can print them in 12 hours. All the machines are started at 9 p.m. while machine P is closed at 11 am and the remaining two machine complete the work. Approximately at what time will the work be finished?
(a) 11:30 a.m (b) 12 noon
(c) 12:30 am (d) 1 p.m.
43. A and B can do a piece of work in 30 days, while B and C can do the same work in 24 days and C and A in 20 days. They all work together for 10 days after B and C leave. How many days more will A take to finish the work?
(a) 18 days (b) 24 days
(c) 30 days (d) 36 days
44. X and Y can do piece of work in 20 days and 12 days respectively. X started the work alone and then after 4 days Y joined him till the completion of the work. How long did he work least?
(a) 6 days (b) 10 days
(c) 15 days (d) 20 days
45. A and B can together finish a work in 30 days. They worked together for 20 days and then B left. After another 20 days, A finished the remaining work. In how many day A alone can finish the job?
(a) 40 (b) 50
(c) 54 (d) 60
46. X can do a piece of work in 40 days. He works at it for 8 days and then Y finished it in 16 days. How long will they together take to complete the work?
(a) $13\frac{1}{3}$ days (b) 15 days
(c) 20 days (d) 56 days
47. A, B and C together can complete a piece of work in 10 days. All the three started working at it together and after 4 days A left. Then B and C together completed the work in 10 more days. A alone could complete the work in:
(a) 15 days (b) 16 days
(c) 25 days (d) 50 days
48. A does $\frac{4}{5}$ of a work in 20 days. then he calls to B and they together finish the remaining work in 3 days. How long B alone would take to do the whole work?
(a) $13\frac{1}{3}$ days (b) 15 days
(c) $37\frac{1}{2}$ days (d) 56 days
49. A and B together can do a piece of work in 30 days. A having worked for 16 days, B finished the remaining work alone in 44 days. In how many days shall B finish the whole work alone?
(a) 30 days (b) 40 days
(c) 60 days (d) 70 days



50. A and B together can do a piece of work in 12 days, which B and C together can do in 16 days. After A has been working at it for 5 days and B for 7 days, C finished it in 13 days. In how many days C alone will do the work?
(a) 16 (b) 24
(c) 36 (d) 48
51. A and B can do a piece of work in 45 days and 40 days respectively. They began to do the work together but A leaves after some days and then B completed the remaining work in 23 days. The number of days after which A left the work was:
(a) 8 (b) 10
(c) 9 (d) 11
52. A can do a piece of work in 14 days which B can do in 21 days. They begin together but 3 days before the completion of the work, A leaves off. The total number of days to complete the work is:
(a) $6\frac{3}{5}$ (b) $8\frac{1}{2}$
(c) $10\frac{1}{5}$ (d) $13\frac{1}{2}$
53. A, B and C complete a work separately in 24, 36 and 48 days respectively. They started together but C left after 4 days of start and A left 3 days before the completion of the work. In how many days will the work be completed?
(a) 15 days (b) 22 days
(c) 25 days (d) 35 days
54. A and B together can complete a work in 12 days. A alone can complete it in 20 days. If B does the work only for half of a day daily, then in how many days A and B together will complete the work?
(a) 12 days (b) $12\frac{1}{4}$ days
(c) 15 days (d) $24\frac{1}{2}$ days
55. A alone can complete a work in 16 days and B alone in 12 days. Starting with A, they work on alternate days. The total work will be complete in:
(a) 12 days (b) 13 days
(c) $13\frac{5}{7}$ days (d) $13\frac{3}{4}$ days
56. A, B and C can do a piece of work in 11 days, 20 days and 55 days respectively, working alone. How soon can the work be done if A assisted by B and C on alternate days?
(a) 7 days (b) 8 days
(c) 9 days (d) 10 days
57. A, B and C can do a piece of work in 20, 30 and 60 days respectively. In how many days can A do the work if he is assisted by B and C on every third day?
(a) 12 days (b) 15 days
(c) 16 days (d) 18 days
58. A and B can separately do a piece of work in 20 and 15 respectively. They worked together for 6 days, after which B was replaced by C. If the work was finished in next 4 days, then the number of days in which C alone could do the work will be?
(a) 30 (b) 35
(c) 40 (d) 60
59. A, B and C can do a piece of work in 36, 54 and 72 days respectively. They started the work but A left 8 days before the completion of the work while B left 12 days before the completion. The number of days for which C worked is:
(a) 4 (b) 8
(c) 12 (d) 24
60. A can do a piece of work in 8 days, 'B' destroy it in 3 days. A does work for 6 days. During the last 2 days of which B has been destroying. How many days must A work alone to complete the work?
(a) $7\frac{1}{2}$ (b) $8\frac{1}{3}$
(c) $7\frac{1}{3}$ (d) $7\frac{1}{4}$
61. Efficiency of Ankita is 50% more than that of Anjali and Anjali takes 18 days to complete a piece of work. Ankita started a work alone and then Anjali joined him 5 days before actual completion of the work. For how many days Ankita worked alone?
(a) $3\frac{2}{3}$ (b) $3\frac{1}{3}$
(c) 4 (d) $4\frac{1}{3}$
62. A piece of work is done by three persons Rakesh Yadav, Bhuvnesh and Pawan in 5 days in the following manner :
Rakesh yadav works for whole time, Bhuvnesh only on the first two days and pawan only on the last three days. This work could have been done by Bhuvnesh and pawan in 6 days without involving Rakesh yadav. If Bhuvnesh and Pawan working together can do as much work in 2 days as Rakesh Yadav can do in 3 days, then find how long will it take for each one to do this work alone?
(a) 10, 20, 10 days
(b) 7, 9, 11 days
(c) 8, 12, 9 days
(d) 9, 18, 9 days
63. Two typists of varying skills can do a job in 6 minutes if they work together. If the first typist typed alone for 4 minutes and then the second typist typed alone for 6 minutes, they would be left with $\frac{1}{5}$ of the whole work. How many minutes would it take the slower typist to complete the typing job working alone?
(a) 10 min (b) 15 min
(c) 12 min (d) 20 min
64. If the work done by $(x-1)$ men in $(x+1)$ days is to the work done by $(x+2)$ men in $(x-1)$ days is in the ratio 9 : 10, then the value of x is equal to :
(a) 5 (b) 6
(c) 7 (d) 8



65. A, B, and C can do a piece of work in 10, 20 and 40 days respectively. If A works on the first day, B on the second day and C works on the third day and again the same process is repeated. How long will it take to complete the work if they work in this manner.
- (a) $16\frac{1}{2}$ days (b) 17 days
(c) 16 days (d) Can't be determined
66. Three machines A, B and C can make 12000 needles in 2 hours, 4 hours and 3 hours respectively. All three machines work for half an hour each but not together. Find the number of hours to make 18500 needles.
- (a) $4\frac{1}{5}$ hours (b) $4\frac{3}{4}$ hours
(c) $4\frac{2}{5}$ hours (d) $4\frac{1}{4}$ hours
67. A and B can do a piece of work in 20 days working together. They work for 5 days and after it C assists them and the work is completed 5 days before. If 3 days work of B is equal to 2 days work of C. Find in how many hours they can do it separately.
- (a) 45, 90, 60 days
(b) 15, 30, 20 days
(c) 25, 30, 20 days
(d) 30, 60, 40 days
68. A, B, C and D can do a piece of work in 12, 16, 24 and 36 days. A starts the work and after each day B, C and D join the work respectively. Find the time to complete the task.
- (a) $5\frac{22}{31}$ days (b) $6\frac{22}{31}$ days
(c) $5\frac{11}{41}$ days (d) None of these
69. A, B, C and D can do a piece of work in 24, 16, 32 and 12 days respectively. If A started the work and after one day B and C also joined him. After two days of that A left the job and meanwhile D joined the work. If B and C left the work 2 days and 4 days respectively before the completion of work. Find how many days D had done the work?
- (a) 4 days (b) $5\frac{8}{17}$ days
(c) 5 days (d) $5\frac{5}{17}$ days
70. A can do a piece of work in 120 days while B can do it in 150 days. They started together and worked for 20 days after this B left the work and A continued it. 12 days after C joined A and the remaining work was completed in 48 days. How long will it take C to complete the work alone?
- (a) 240 days (b) 210 days
(c) 300 days (d) 160 days
71. Rakesh Yadav employs some men to do a piece of work in 90 days working 6 hours a day. But after working for 60 days they went on strike due to which the work was disrupted for 10 days and there was no work during strike. After that Rakesh Yadav employed 4 additional men to finish the work and he also increased the working hours by 2 hours. Find the initial number of men Rakesh Yadav employed?
- (a) 40 men (b) 30 men
(c) 35 men (d) 32 men
72. $\left[4 - \frac{5}{1 + \frac{1}{3 + \frac{4}{9}}} \right]^{th}$ part of a work complete in 10 minutes, then to complete $\frac{3}{5}^{th}$ of that work it will take :
- (a) 36 min (b) 48 min
(c) 45 min (d) 18 min
73. When A, B and C are deployed for a work, A and B together do 80% of the work and B and C together do 55% of the work. Who is the most efficient?
- (a) A
(b) B
(c) C
(d) Can't be determined
74. Rakesh Yadav and Jitu are two workers working together they can complete the whole work in 10 hours. Rakesh Yadav can complete the work in 8 hours with the help of Pawan. Similarly Jitu and Pawan can complete the work in $13\frac{1}{3}$ hours. If Rakesh Yadav and Jitu did 50% of the work and after that Pawan work all the time. How much time needed to complete the work?
- (a) 15 hours
(b) 10 hours
(c) 11 hours (d) 30 hours
75. A group of workers can complete a job in 9 days. But it so happens that every alternate day starting from the second day, 2 workers are withdrawn from the job and every alternate day starting from the third day one worker added to the group. In such a way that the job is finished by the time and there is no worker left. If it takes double the time to finish the job now, find the number of workers who started the job?
- (a) 5 (b) 10
(c) 15 (d) 20
76. A man has three sons. The man can do twice the work of his three sons. The first and the second son can do the work in 24 days and 36 days respectively. If the man completes the work in $3\frac{3}{11}$ days. Then find out the time taken by the third person to finish the work?
- (a) 12 days
(b) 14 days
(c) 18 days
(d) 11 days



77. A completes half as much work as B in equal time and C completes half as much work as (A+B) in equal time. If C alone can complete the work in 40 days then in how many days they complete the work together?
- (a) $13\frac{1}{3}$ days (b) $14\frac{1}{3}$ days
(c) $8\frac{1}{3}$ days (d) $12\frac{1}{2}$ days
78. A contractor predicts that of the two workers one can make a wall in 12 hours and the other in 11 hours. He finds his experience that if both the workers work together they use 300 bricks more per hour, and build the wall in 4 hours. Then find the number of bricks in the wall?
- (a) 3960 (b) 4060
(c) 4000
(d) None of these
79. In a factory there are three shifts of work in a day. During these three shifts the average working efficiency of workers are 80% 70% and 50% respectively. If work is completed in 60 days by working in first shift. Then in how many days the work will be completed by working three shifts all the day?
- (a) 30 days (b) 24 days
(c) 36 days (d) 18 days
80. A and B can complete a work in 6 days. A and C can do the same work $2\frac{1}{2}$ days earlier than B + C. They together can finish the whole work in 5 days. Then in how many days will they individually complete the work?
- (a) 10, 15, 30 (b) 10, 20, 40
(c) 6, 12, 18 (d) None of these
81. B and C are twice efficient than A. A and C are $\frac{19}{8}$ times efficient than B. The ratio of efficiency of B and C is 4 : 5. If together they complete the work in $13\frac{1}{3}$ days then Find in how many days will B complete the work?
- (a) 40 days (b) 45 days
(c) 36 days (d) None of these
82. Rakesh Yadav can do $\frac{1}{3}$ rd of the work in 4 days Jitu $66\frac{2}{3}\%$ of the work in 6 days and Pawan $\frac{2}{5}$ th of the work in 10 days. First day Rakesh Yadav, second day Jitu and third day Pawan do the work. Again fourth day Rakesh Yadav and in the same manner Jitu and Pawan do the work. Then find in how many days will the work complete?
- (a) $12\frac{56}{75}$ days (b) $18\frac{56}{75}$ days
(c) $10\frac{56}{75}$ days (d) None of these
83. The ratio of efficiencies of A, B and C is 2 : 3 : 4. A and C are busy somewhere so they work in alternate days. In this manner the work completed in 10 days. If they got 1200 Rs. as wages then what is the share of each?
- (a) 200 Rs. 600 Rs. 400 Rs.
(b) 400 Rs. 400 Rs. 400 Rs.
(c) 400 Rs. 600 Rs. 200 Rs.
(d) None of these
84. A and B together can do a piece of work in 16 days and B and C can do the same work in 24 days. From starting A and B worked for 4 days and 7 days respectively. When A leaves the work then C joins the work and then he works for 23 days and complete the work. Then find in how many days will C complete the work alone?
- (a) 32 days (b) 16 days
(c) 8 days (d) None of these
85. Rakesh Yadav takes thrice the time of Jitu to complete a piece of work, and Jitu takes five times the time of pawan to complete the same work. If they work together then they can finish the work in 30 days. Then find the time taken by them to complete the work individually?
- (a) 570 days, 190 days, 38 days
(b) 380 days, 190 days, 38days
(c) 570 days, 190 days, 57 days
(d) None of these
86. A does $\frac{1}{4}$ th as much work as B in three fifth of time. If they work together they take 24 days to complete a work, How much time shall A take to do it?
- (a) $81\frac{3}{5}$ days
(b) $81\frac{4}{5}$ days
(c) $80\frac{3}{5}$ days
(d) None of these
87. A bucket P is thrice efficient than the bucket Q to fill up the empty drum, the bucket P is poured 60 times into the drum. If the buckets P and Q are poured together into the drum then how many times will it require to fill the drum?
- (a) 90 (b) 30
(c) 60 (d) 45
88. A vehicle can carry the luggage from one place to another at a rate of 3 tons in 5 minutes, and an another vehicle can carry the luggage from one place to another at a rate of 1 ton in 2 minutes. If both the vehicles used together then how much time will they take to carry 33 tons luggage from one place to another?
- (a) 25 min. 30 second
(b) 30 min.
(c) 35 min.
(d) 40 min. 45 seconds



89. Rakesh Yadav, Jitu and Pawan can do a piece of work in 20, 12 and 25 days respectively. They worked separately for $5\frac{1}{3}$, 4 and 10 days respectively and the work had been finished. If they got 1800 Rs. for the whole work then, Find out the share of each ?
 (a) 480, 600, 720
 (b) 400, 600, 720
 (c) 480, 480, 840
 (d) None of these
90. A, B and C together can do a piece of work in 36 days. A and B can do twice the work as C, and A and C can do thrice the work as B. Then find in how many days they can do the work separately?
 (a) $86\frac{2}{5}$, 144, 108
 (b) $\frac{432}{5}$, 144, 112
 (c) $86\frac{2}{5}$, 112, 144
 (d) $\frac{432}{5}$, 100, 200
91. Three typist A, B and C working together 8 hours per day can type 900 pages in 20 days. In a day B types as many pages more than A as C types as many pages more than B. The number of pages typed by A in 4 hours equal to the number of pages typed by C in 1 hour. How many pages C types in each hour?
 (a) 1 (b) 2
 (c) 3 (d) 4
92. Anne, Benne and Cenne are three friends. Anne and Benne are twins. Benne takes 2 days more than Cenne to complete the work. If Anne started a work and 3 days later Benne joins him, then the work gets completed in 3 more days. Working together Anne, Benne and Cenne can complete thrice the original work in 6 days. In how many days Benne can complete twice the original work with double the efficiency working alone?
 (a) 2 (b) 3
 (c) 4 (d) 6
93. Henry and Ford are two different persons, but when they worked together, they complete it in 10 days. Had Henry worked at half of his efficiency and Ford at 5 times of his efficiency it would have taken them to finish the job in 50% of the scheduled time. In how many days Ford can complete the job working alone?
 (a) 12 (b) 24
 (c) 15 (d) 30
94. Pascal and Rascal are two workers. Working together they can complete the whole work in 10 hours. If the Pascal worked for 2.5 hours and Rascal worked for 8.5 hours, still there was half of the work to be done. In how many hours Pascal working alone, can complete the whole work?
 (a) 24 hours
 (b) $17\frac{1}{7}$ hours
 (c) 40 hours
 (d) Can't be determined
95. Milinda takes $8\frac{1}{3}$ hours more when she works alone in comparison of when she works with Bill. While Bill takes $5\frac{1}{3}$ hours more when he work alone in comparison to the time, when he works with Milinda. How long it will take Bill to complete the work alone?
 (a) 10 hours (b) 15 hours
 (c) 18 hours (d) 12 hours
96. Two workers undertake to do a job. The second worker started working 2 hours after the first. Five hours after the second worker has begun working there is still $\frac{9}{20}$ of the work to be done. When the assignment is completed, it turns out that first worker has done 60% of the work, while second worker has done rest of the work. How many hours would it take each one to do the whole job individually?
 (a) 10 hours and 12 hours
 (b) 15 hours and 10 hours
 (c) 20 hours and 25 hours
 (d) 18 hours and 20 hours
97. A group of workers was put on a job. From the second day onwards, one worker was withdrawn each day. The job was finished when the last worker was withdrawn. Had no worker been withdrawn at any stage, the group would have finished the job in 55% of the time. How many workers were there in the group?
 (a) 50 (b) 40
 (c) 45 (d) 10
98. Rakesh Yadav can do the 6 times the actual work in 36 days while Jitu can do the one-fourth of the original work in 3 days. In how many days will both working together complete the 3 times of the original work?
 (a) 6 (b) 10
 (c) 12 (d) 15
99. Two persons having different productivity of labour, working together can reap a field in 2 days. If one-third of the field was reaped by the first man and rest by the other one working alternatively took 4 days. How long did it take for the faster person to reap the whole field working alone?
 (a) 12 (b) 8
 (c) 6 (d) 3



100. Brahma, Vishnu and Mahesh are three friends with different productivity. Brahma working alone needs as much time as Vishnu and Mahesh working together, while Vishnu himself needs 8 hours more working alone than when he works with Mahesh. Brahma working alone needs 8 hours less than Vishnu needs working alone. In how much time Brahma, Vishnu and Mahesh working together can complete the job?
- (a) 4 hours (b) 5 hours
(c) 6 hours (d) 8 hours
101. A contractor employed a certain number of workers to finish constructing a road in a scheduled time. Sometime later, when a part of work had been completed, he realised that the work would get delayed by three-fourth of the scheduled time, so he at once doubled the number of workers and thus he managed to finish the road on the scheduled time. How much work had been completed, before increasing the number of workers?
- (a) 10 %
(b) $14\frac{2}{7}$ %
(c) 20 %
(d) can't be determined
102. Railneer is packaged in a water bottling plant, with the help of two machines M_1 and M_2 . M_1 and M_2 produces 400 and 600 bottles per minute. One day's production can be processed by M_1 operating alone for 9 hour, by M_2 operating alone for 6 hours or by both M_1 and M_2 operating simultaneously for 3 hours and 36 minutes. If one day production is processed by M_1 operating alone for $\frac{1}{3}$ of the time and M_1 and M_2 simultaneously operating for $\frac{2}{3}$ of the time, then in how many hours total production of one day will be completed?
- (a) 2 (b) 3
(c) 4.5 (d) 4.8
103. A single reservoir supplies the petrol to the whole city, while the reservoir is fed by a single pipeline filling the reservoir with the stream of uniform volume. When the reservoir is full and if 40,000 litres of petrol is used daily, the supply fails in 90 days. If 32,000 litres of petrol is used daily, it fails in 60 days. How much petrol can be used daily without the supply ever failing?
- (a) 64000 lit. (b) 56000 lit.
(c) 78000 lit. (d) 60000 lit.
104. A and B can complete the work individually in 24 days and 30 days respectively, working 10 hours a day. Work is to be done in two shift. Morning shift lasts for 6 hours and evening shift lasts for 4 hours. On the first day A works in the morning shift while B works in the evening shift. Next day A works in the evening shift while B works in the morning shift and so on. It means they work alternatively with respect to their shifts. Thus they work on this pattern till the work is completed. On which day the work got completed?
- (a) 26th day (b) 27th day
(c) 28th day (d) 30th day
105. A, B and C three weavers have to supply an order of 100 shawls. A can weave a shawl in 2 hours, B in 3 hours and C in 4 hours respectively. It is known that even being a joint contract each one weaves his own shawl completely i.e., no other weaver help to the rest weavers. In how many hours they will complete the order irrespective of day or night?
- (a) 93 hours (b) 100 hours
(c) $92\frac{4}{13}$ hours (d) 94 hours
106. A is twice efficient as B and together they do the same work in as much time as C and D together. If C and D can complete the work in 20 and 30 days respectively, working alone, then in how many days A can complete the work individually :
- (a) 12 days (b) 18 days
(c) 24 days (d) 30 days
107. C is twice efficient as A. B takes thrice as many days as C. A takes 12 days to finish the work alone. If they work in pairs (i.e. AB, BC, CA) starting with AB on the first day then BC on the second day and AC on the third day and so on, then how many days are required to finish the work?
- (a) $6\frac{1}{5}$ days (b) 4.5 days
(c) $5\frac{1}{9}$ days (d) 8 days
108. B is twice efficient as A and A can do a piece of work in 15 days. A started the work and after a few days B joined him. They completed the work in 11 days, from the starting. For how many days they worked together?
- (a) 1day (b) 2 days
(c) 6 days (d) 5 days
109. A, B and C are three book Publishers. A takes 8 minutes, B takes 12 minutes and C takes 16 minutes to Publish a book. If they work each day for 12 hour, then on an average, how many books each one publish per day ?
- (a) 65 (b) 52
(c) 48 (d) 70
110. A man, a woman and a girl worked for a contractor for the same period. A man is twice efficient as a woman and a woman is thrice efficient as a girl. Rs. 10,000 were given to all of them. What is the sum of money received by a woman and a girl together?
- (a) Rs. 5500 (b) Rs. 4500
(c) Rs. 4000 (d) Rs. 6000



111. $(x - 2)$ men can do a piece of work in x days and $(x + 7)$ men can do 75% of the same work in $(x - 10)$ days. Then in how many days can $(x + 10)$ men finish the work?
 (a) 27 days (b) 12 days
 (c) 25 days (d) 18 days
112. 314 weavers weaves 6594 shawls in $\frac{1}{6}$ hours. What is the number of shawls weaved per hour by an average weaver?
 (a) 42 (b) 21
 (c) 102 (d) 126
113. Colonel, Major and General started a work together for Rs. 816. Colonel and Major did $\frac{8}{17}$ of the total work, while Major and General together did $\frac{12}{17}$ of the whole work. What is the amount of the least efficient person?
 (a) Rs. 256 (b) Rs. 144
 (c) Rs. 85
 (d) can't be determined
114. When A, B and C are deployed for a task, A and B together do 70% of the work and B and C together do 50% of the work. Who is most efficient?
 (a) A (b) B
 (c) C
 (d) can't be determined
115. C takes twice the number of days to do a piece of work than A takes. A and B together can do it in 6 days while B and C can do it in 10 days. In how many days A alone can do the work?
 (a) 60 (b) 30
 (c) 6 (d) 7.5
116. A and B undertook a work for Rs. 350. A got Rs. 150 more than that of B, when they worked together. B takes 9 days more than A, when the work individually. In how many days A and B working together can do the whole work?
 (a) 5 (b) $4\frac{2}{7}$
 (c) $4\frac{5}{7}$ (d) $5\frac{4}{7}$
117. A takes 6 days less than B to do a certain job and 2 days more than C. A and B together can do the work in the same time as C. In how many days B alone can do the complete work?
 (a) 10 (b) 14
 (c) 12 (d) 16
118. The ratio of efficiency of A is to C is 5 : 3. The ratio of number of days taken by B is to C is 2 : 3, A takes 6 days less than C, when A and C completes the work individually. B and C started the work and left after 2 days. The number of days taken by A to finish the remaining work is:
 (a) 4.5 (b) 5
 (c) 6 (d) $9\frac{1}{3}$
119. A, B and C can do a piece of work in 10, 12 and 15 days respectively, they start working together but C leaves after working 3 days and B, 4 days before the completion of work. Find in how many days the work was finished?
 (a) $6\frac{12}{15}$ (b) $7\frac{2}{9}$
 (c) $7\frac{5}{9}$ (d) 3
120. A, B and C can do a piece of work in 5, 8 and 10 days respectively, they start working together but C leaves after working 2 days and B, 1 day before completion of work. Find in how many days the work was finished.
 (a) 3 days (b) $3\frac{1}{7}$ days
 (c) $3\frac{2}{7}$ days (d) $2\frac{11}{13}$ days
121. A, B and C can do a work in 8, 16, 24 days respectively, they all begin together. A continues to work till it is finished C leaving off 2 days and B one day before its completion. In what time is the work finished.
 (a) $5\frac{2}{9}$ (b) 7
 (c) 5 (d) $5\frac{7}{9}$
122. A and B can do a work in 12 days, B and C in 15 days and C and A in 20 days. If A, B and C work together, they will complete the work in :
 (a) 5 days (b) $7\frac{5}{6}$ days
 (c) 10 days (d) $15\frac{2}{3}$ days
123. A and B can do a piece of work in 72 days. B and C can do it in 120 days. A and C can do it in 90 days. In how many days all the three together can do the work?
 (a) 80 days (b) 100 days
 (c) 60 days (d) 150 days
124. A particular job can be completed by a team of 10 men in 12 days. The same job can be completed by a team of 10 women in 6 days. How many days are needed to complete the job if the two teams work together?
 (a) 4 days (b) 6 days
 (c) 9 days (d) 18 days
125. A and B can do a piece of work in 12 days, B and C in 8 days and C and A in 6 days. How long would B take to do the same work alone ?
 (a) 24 days (b) 32 days
 (c) 40 days (d) 48 days
126. A and B together can complete a work in 8 days and B can C together in 12 days. All of the three together can complete the work in 6 days. In how much time will A and C together complete the work ?
 (a) 8 days (b) 10 days
 (c) 12 days (d) 20 days
127. A and B working together; can do a piece of work in $4\frac{1}{2}$ hours. B and C working together can do it in 3 hours. C and A working together can do it in $2\frac{1}{4}$ hours. All of them begin the work at the same time. Find how much time they will take to finish the piece of work.
 (a) 3 hours (b) 2 hours
 (c) 3.5 hours (d) 3.25 hours



128. A, B and C together can complete a piece of work in 30 minutes. A and B together can complete the same work in 50 minutes. C alone can complete the work in
- (a) 60 minutes (b) 75 minutes
(c) 80 minutes (d) 150 minutes
129. A can do a piece of work in 12 days and B in 15 days. They work together for 5 days and then B left. The days taken by A to finish the remaining work is :
- (a) 3 (b) 5
(c) 10 (d) 121
130. A can complete a work in 'm' days and B can complete it in 'n' days. How many days will it take to complete the work if both A and B work together?
- (a) $(m + n)$ days
(b) $\left(\frac{1}{m} \times \frac{1}{n}\right)$ days
(c) $\left(\frac{m+n}{mn}\right)$ days
(d) $\left(\frac{mn}{m+n}\right)$ days
131. A takes three times as long as B and C together to do a job. B takes four times as long as A and C together to do the work, if all the three working together can complete the job in 24 days. then the number of days A alone will take to finish the job is
- (a) 100 (b) 96
(c) 95 (d) 90
132. How many men need to be employed to complete a job in 5 days, If 15 men can complete $\frac{1}{3}$ rd of the job in 7 days?
- (a) 20 (b) 21
(c) 45 (d) 63
133. x can copy 80 pages in 20 hours, x and y together can copy 135 pages in 27 hours. Then y can copy 20 pages in
- (a) 20 hours (b) 3 hours
(c) 24 hours (d) 12 hours
134. A can do a piece of work in 12 days and B can do it in 18 days. They work together for 2 days and then A leaves. How long will B take to finish the remaining work?
- (a) 6 days (b) $5\frac{1}{3}$ days
(c) 8 days (d) 13 days
135. 8 men can do a work in 12 days. After 6 days of work, 4 more men were engaged to finish the work in how many days would the remaining work be completed?
- (a) 2 (b) 3
(c) 4 (d) 5
136. A and B can complete a work in 15 days and 10 days respectively. They started doing the work together but after 2 days B had to leave and A alone completed the remaining work. The whole work was completed in:
- (a) 10 days (b) 8 days
(c) 12 days (d) 15 days
137. A man and a boy can complete a work together in 24 days. If for the last six days man alone does the work then it is completed in 26 days. How long the boy will take to complete the work alone?
- (a) 72 days (b) 20 days
(c) 24 days (d) 36 days
138. A and B can complete a piece of work in 12 and 18 days respectively. A begins to do the work and they work alternatively one at a time for one day each. The whole work will be completed in
- (a) $14\frac{1}{3}$ days (b) $15\frac{2}{3}$ days
(c) $16\frac{1}{3}$ days (d) $18\frac{2}{3}$ days
139. A, B and C can complete a work in 10, 12 and 15 days respectively. They started the work together. But A left work before 5 days of its completion. B also left the work 2 days after A left. In how many days was the work completed?
- (a) 4 days (b) 5 days
(c) 7 days (d) 8 days
140. A, B and C can do a piece of work in 30, 20 and 10 days respectively. A is assisted by B on one day and by C on the next day, alternately. How long would the work take to finish?
- (a) $9\frac{3}{8}$ days (b) $4\frac{8}{8}$ days
(c) $8\frac{4}{13}$ days (d) $3\frac{9}{13}$ days
141. A can do a piece of work in 8 days which B can destroy in 3 days. A has worked for 6 days during the last 2 of which B has been destroying. How many days must A now work alone to complete the work?
- (a) 7 days (b) $7\frac{1}{3}$ days
(c) $7\frac{2}{3}$ days (d) 8 days
142. A and B together can complete a work in 3 days. They start together. But after 2 days B left and A completed after 2 more days. B alone could do the work in
- (a) 10 days (b) 4 days
(c) 6 days (d) 8 days
143. A, B and C can do a piece of work in 24, 30 and 40 days respectively. They began the work together but C left 4 days before completion of the work. In how many days was the work done?
- (a) 13 (b) 12
(c) 14 (d) 11
144. A man, a woman and a boy can together complete a piece of work in 3 days. If a man alone can do it in 6 days and a boy alone in 18 days, how long will a woman alone take to complete the work?
- (a) 9 days (b) 21 days
(c) 24 days (d) 27 days



145. If 1 man or 2 women or 3 boys can complete a piece of work in 88 days then 1 man 1 woman and 1 boy together will complete it in
(a) 36 days (b) 42 days
(c) 48 days (d) 54 days

146. A can do $\frac{1}{2}$ of a piece of work in 5 days, B can do $\frac{3}{5}$ of the same work in 9 days and C can do $\frac{2}{3}$ of that work in 8 days In how many days can three of them together do the work?
(a) 3 days (b) 5 days
(c) $4\frac{1}{2}$ days (d) 4 days

147. A can do a work in 20 days and B in 40 days. If they work on it together for 5 days then the fraction of the work that is left is:

- (a) $\frac{5}{8}$ (b) $\frac{8}{15}$
(c) $\frac{7}{15}$ (d) $\frac{1}{10}$

148. A does half work as B does three fourth of a time if together they take 18 days to complete a work how much time shall B take to do it alone?
(a) 30 days (b) 35 days
(c) 40 days (d) 45 days

149. A company employed 200 workers to complete a certain work in 150 days If only one fourth of the work has been done in 50 days then in order to complete the whole work in time the number of additional workers to be employed was.

- (a) 100 (b) 300
(c) 600 (d) 200

150. Janardan completes $\frac{2}{3}$ of his work in 10 days, Time he will take to complete $\frac{3}{5}$ of the same work is -

- (a) 8 days (b) 6 days
(c) 9 days (d) 4 days

151. Babu and Asha can do a job together in 7 days Asha is $1\frac{3}{4}$ time as efficient as Babu. The same job can be done by Asha alone in

- (a) $\frac{49}{4}$ days (b) $\frac{49}{3}$ days
(c) 11 days (d) $\frac{28}{3}$ days

152. A can do a piece of work in 70 days and B is 40% more efficient than A The number of days taken by B to do the same work is

- (a) 40 days (b) 60 days
(c) 50 days (d) 45 days

153. A is 50% as efficient as B. C does half of the work done by A and B together. If C alone does the work in 20 days then A, B and C together can do the work in -

- (a) $5\frac{2}{3}$ days (b) $6\frac{2}{3}$ days

- (c) 6 days (d) 7 days

154. A is thrice as good a workman as B and is, therefore able to finish a piece of work in 60 days less than B The time (in days) in which they can do it working together is

- (a) 22 days (b) $22\frac{1}{2}$ days
(c) 23 day (d) $23\frac{1}{4}$ days

155. A takes 10 days less than the time taken by B to finish a piece of work. If both A and B can do it in 12 days then the time taken by B alone to finish the work is

- (a) 30 days (b) 27 days
(c) 20 days (d) 25 days

156. A can do certain job in 12 days B is 60% more efficient than A to do the same job B alone would take :

- (a) $7\frac{1}{2}$ days (b) 8 days
(c) 10 days (d) 7 days

157. A can do a certain work in 12 days B is 60% more efficient than A How many days will B and A together take to do the same job?

- (a) $\frac{80}{13}$ days (b) $\frac{70}{13}$ days
(c) $\frac{75}{13}$ days (d) $\frac{60}{13}$ days



ANSWER KEY

1. (d)	17. (c)	33. (b)	49. (c)	65. (a)	81. (b)	97. (d)	113.(b)	129.(a)	145.(c)
2. (c)	18. (c)	34. (b)	50. (b)	66. (d)	82. (a)	98. (c)	114.(a)	130.(d)	146.(d)
3. (b)	19. (c)	35. (a)	51. (c)	67. (d)	83. (a)	99. (d)	115.(d)	131.(b)	147.(a)
4. (d)	20. (c)	36. (a)	52. (c)	68. (a)	84. (a)	100.(c)	116.(b)	132.(d)	148.(a)
5. (a)	21. (b)	37. (d)	53. (a)	69. (d)	85. (a)	101.(b)	117.(c)	133.(a)	149.(a)
6. (d)	22. (c)	38. (d)	54. (c)	70. (a)	86. (a)	102.(c)	118.(c)	134.(d)	150.(c)
7. (b)	23. (c)	39. (c)	55. (d)	71. (d)	87. (d)	103.(b)	119.(c)	135.(c)	151.(c)
8. (c)	24. (c)	40. (c)	56. (b)	72. (b)	88. (b)	104.(b)	120.(d)	136.(c)	152.(c)
9. (b)	25. (c)	41. (c)	57. (b)	73. (a)	89. (a)	105.(a)	121.(a)	137.(a)	153.(b)
10. (c)	26. (a)	42. (d)	58. (c)	74. (a)	90. (a)	106.(b)	122.(c)	138.(a)	154.(b)
11. (c)	27. (b)	43. (a)	59. (d)	75. (b)	91. (c)	107.(c)	123.(c)	139.(c)	155.(a)
12. (d)	28. (c)	44. (b)	60. (c)	76. (a)	92. (d)	108.(b)	124.(a)	140.(a)	156.(a)
13. (c)	29. (c)	45. (d)	61. (a)	77. (a)	93. (d)	109.(a)	125.(d)	141.(b)	157.(d)
14. (b)	30. (a)	46. (a)	62. (d)	78. (a)	94. (b)	110.(c)	126.(a)	142.(c)	
15. (b)	31. (c)	47. (c)	63. (b)	79. (b)	95. (d)	111.(b)	127.(b)	143.(d)	
16. (c)	32. (a)	48. (c)	64. (d)	80. (a)	96. (c)	112.(d)	128.(b)	144.(a)	

Solution

1. (d) $\begin{array}{l} A \rightarrow 7 \begin{array}{l} 1 \\ 1 \end{array} \\ B \rightarrow 7 \end{array} \rightarrow 7 \text{ (Total work)}$

Note:- To find total work we take L.C.M of A and B time. From total work and time we calculate the per day efficiency/work of A and B.

A's 1 day work = 1

B's 1 day work = 1

(A + B)'s day work = (1 + 1) = 2

Time taken by both to finish the total work

$$= \frac{\text{Total work}}{\text{Total efficiency}} = \frac{7}{2} \text{ days}$$

2. (c) $\begin{array}{l} X \rightarrow 30 \begin{array}{l} 2 \\ 2 \end{array} \\ Y \rightarrow 20 \end{array} \rightarrow 60 \text{ (Total work)}$

To find the total work we take L.C.M of X and Y time. From total work and time we calculate the per day efficiency/work of X and Y.

X's 1 day work = 2

Y's 1 day work = 3

(x and Y)'s 1 day work = (2 + 3) = 5

Together to finish the total work

$$= \frac{60}{5} = 12 \text{ days}$$

3. (b) $\begin{array}{l} P \rightarrow 15 \begin{array}{l} 2 \\ 1 \end{array} \\ Q \rightarrow 30 \end{array} \rightarrow 30 \text{ (Total work)}$

By calculating L.C.M of P's and Q's Time, we obtain total work. Then we calculate per day efficiency/work of P and Q.

P's one day work = 2

Q's one day work = 1

(P and Q)'s one day work = 3

P and Q together complete the

$$\text{work} = \frac{30}{3} = 10 \text{ days}$$

4. (d) $\begin{array}{l} A \rightarrow 23 \begin{array}{l} 29 \\ 23 \end{array} \\ B \rightarrow 29 \end{array} \rightarrow 667 \text{ (Total work)}$
Total work (L.C.M) of 23, 29) = 667

A's one day work = 29

B's one day work = 23

A and B together complete the

$$\text{work} = \frac{\text{Total work}}{\text{Total efficiency}}$$

$$= \frac{667}{29+23} = \frac{667}{52} = 12 \frac{43}{52} \text{ days}$$

5. (a) $\begin{array}{l} \text{Ram} \rightarrow 30 \begin{array}{l} 2 \\ 1 \end{array} \\ \text{Vijay} \rightarrow 60 \end{array} \rightarrow 60 \text{ (Total work)}$

Total work = 60

Total Efficiency of Ram and Vijay in one day = 2 + 1 = 3

Ram and Shyam together complete the work

$$= \frac{\text{Total work}}{\text{Total efficiency}} = \frac{60}{3} = 20 \text{ days}$$

6. (d) $\begin{array}{l} \text{Aman} \rightarrow 8 \begin{array}{l} 5 \\ 4 \end{array} \\ \text{Shyam} \rightarrow 10 \end{array} \rightarrow 40 \text{ (Total work)}$

Total Efficiency of Aman and Shyam in one day = 5 + 4 = 9

Aman and Shyam together complete the work (40 units)

$$= \frac{\text{Total work}}{\text{Total efficiency}} = \frac{40}{9} \text{ days}$$

Aman and Shyam together to complete the double (40 × 2)

$$\text{work} = 2 \times \frac{40}{9} = \frac{80}{9} \text{ days}$$

7. (b) $\begin{array}{l} A \rightarrow 50 \begin{array}{l} 3 \\ 5 \end{array} \\ B \rightarrow 30 \end{array} \rightarrow 150 \text{ (Total work)}$

Total efficiency of A and B

$$= 5 + 3 = 8$$

A and B together complete the

$$\text{work} = \frac{150}{8} = 18 \frac{3}{4} \text{ days}$$

8. (c) $\begin{array}{l} X \rightarrow 18 \begin{array}{l} 2 \\ 1 \end{array} \\ Y \rightarrow 36 \end{array} \rightarrow 36 \text{ (Total work)}$

Total efficiency of X and Y

$$= 2 + 1 = 3$$

X and Y together to complete the Two-Third work

$$= \frac{2}{3} \times \left(\frac{36}{3} \right) = 8 \text{ days}$$

9. (b) $\begin{array}{l} \text{Ashish} \rightarrow 25 \begin{array}{l} 3 \\ 1 \end{array} \\ \text{Rohit} \rightarrow 75 \end{array} \rightarrow 75 \text{ (Total work)}$

Total efficiency of Ashish and Rohit = 3 + 1 = 4

Ashish and Rohit together complete the Two-Fifth work

$$= \frac{2}{5} \times \left(\frac{75}{4} \right) = \frac{15}{2} \text{ days}$$

10. (c) $\begin{array}{l} A \rightarrow 60 \begin{array}{l} 3 \\ 2 \end{array} \\ B \rightarrow 90 \end{array} \rightarrow 180 \text{ (Total work)}$

Total efficiency of A and B = 3 + 2 = 5

A and B together to complete the

$$\text{Four-time work} = \frac{180}{5} \times 4 = 144 \text{ days.}$$

11. (c) $\begin{array}{l} A \rightarrow 12 \begin{array}{l} 5 \\ 4 \\ 3 \end{array} \\ B \rightarrow 15 \\ C \rightarrow 20 \end{array} \rightarrow 60$

Total efficiency = 5 + 4 + 3 = 12
A, B and C together to complete

$$\text{the work} = \frac{60}{12} = 5 \text{ days}$$

12. (d) $\begin{array}{l} P \rightarrow 20 \begin{array}{l} 9 \\ 6 \\ 12 \\ 4 \end{array} \\ Q \rightarrow 30 \\ R \rightarrow 15 \\ S \rightarrow 45 \end{array} \rightarrow 180$

Total efficiency of P, Q, R and S

$$= 9 + 6 + 12 + 4 = 31$$

P, Q, R and S together complete

$$\text{the work} = \frac{180}{31} \text{ hours}$$

13. (c) $\begin{array}{l} \text{Ram} \rightarrow 7 \begin{array}{l} 171 \\ 133 \\ 63 \end{array} \\ \text{Shyam} \rightarrow 9 \\ \text{Ankit} \rightarrow 19 \end{array} \rightarrow 1197$

Total efficiency of Ram, Shyam and Ankit = 171 + 133 + 63 = 367

Ram, Shyam and Ankit together complete the work

$$= \frac{1197}{367} = 3 \frac{96}{367} \text{ days}$$

14. (b) $\begin{array}{l} \text{Shakshi} \rightarrow 9 \begin{array}{l} 4 \\ 3 \\ 1 \end{array} \\ \text{Priyanka} \rightarrow 12 \\ \text{Pragati} \rightarrow 36 \end{array} \rightarrow 36$

Total efficiency of Shakshi, Priyanka and Pragati

$$= 4 + 3 + 1 = 8$$

Shakshi, Priyanka and Pragati together complete the 60% of the

$$\text{work} = 60\% \text{ of } \left(\frac{36}{8}\right)$$

$$= \frac{60}{100} \times \frac{36}{8} = \frac{27}{10} \text{ days}$$

15. (b) Naveen $\rightarrow 17$ $\xrightarrow{399}$
 Ashish $\rightarrow 19$ $\xrightarrow{357}$
 Mohit $\rightarrow 21$ $\xrightarrow{323}$ 6783

Total efficiency of Naveen, Ashish and Mohit = $399 + 357 + 323$
 $= 1079$

Naveen, Ashish and Mohit together complete the work

$$= \frac{6783}{1079} = 6 \frac{304}{1079} \text{ days}$$

16. (c) Rakesh $\rightarrow 30$ $\xrightarrow{6}$
 Ashok $\rightarrow 45$ $\xrightarrow{4}$
 Raju $\rightarrow 60$ $\xrightarrow{3}$ 180

Total efficiency of Rakesh, Ashok and Raju = $6 + 4 + 3 = 13$

Rakesh, Ashok and Raju together to complete the Two-fifth work

$$= \frac{2}{5} \times \frac{180}{13} = \frac{72}{13} \text{ days}$$

17. (c) Ist $\rightarrow 9$ $\xrightarrow{4}$
 IInd $\rightarrow 12$ $\xrightarrow{3}$ 36

Total efficiency of Ist and IInd = $4 + 3 = 7$

Ist and IInd together to make it

$$\text{flat} = \frac{36}{7} = 5 \frac{1}{7} \text{ minutes}$$

18. (c) Ankit $\frac{1}{3}$ unit work = 5 days

Ankit 1 unit work = $5 \times 3 = 15$ days

Vinod $\frac{3}{5}$ unit work = 15 days

Vinod 1 unit work

$$= 15 \times \frac{5}{3} = 25 \text{ days}$$

Chetan $\frac{6}{7}$ unit work = 18 days

Chetan 1 unit work

$$= 18 \times \frac{7}{6} = 21 \text{ days}$$

Ankit $\rightarrow 15$ $\xrightarrow{35}$
 Vinod $\rightarrow 25$ $\xrightarrow{21}$
 Chetan $\rightarrow 21$ $\xrightarrow{25}$ 525

Total Efficiency of one day = $35 + 21 + 25 = 81$

All three together complete the

$$\text{work} = \frac{525}{81} = \frac{175}{27} \text{ days}$$

19. (c) man $\rightarrow 5$ $\xrightarrow{3}$
 man+son $\rightarrow 3$ $\xrightarrow{5}$ 15

Efficiency of son in one day = $5 - 3 = 2$

son complete the work in

$$= \frac{15}{2} \text{ days} = 7 \frac{1}{2} \text{ days}$$

20. (c) A $\rightarrow 16$ $\xrightarrow{3}$
 B $\rightarrow 12$ $\xrightarrow{4}$ 48

A + B + C $\rightarrow 4$ $\xrightarrow{12}$
 Efficiency of C in one day

$$= 12 - 4 - 3 = 5$$

C completes the work in

$$= \frac{48}{5} \text{ days} = 9 \frac{3}{5} \text{ days}$$

21. (b) A B C
 Time Ratio $\rightarrow 6 \quad 3 \quad 2$
 Efficiency Ratio $\rightarrow 1 \quad 2 \quad 3$

Total Efficiency of A, B and C in one day = $1 + 2 + 3 = 6$

Total work = $6 \times 2 = 12$ units

B alone can finish the work

$$= \frac{12}{2} = 6 \text{ days}$$

22. (c) X $\frac{1}{4}$ unit work = 10 days

X 1 unit work = $10 \times 4 = 40$ days

Y 40% work = 40 days

$$\text{Y 100\% work} = 40 \times \frac{100}{40} = 100 \text{ days}$$

Z $\frac{1}{3}$ unit work = 13 days

Z 1 unit work = $13 \times 3 = 39$ days

Z will be the first to complete the work.

23. (c) P, Q, and R typist type 216 pages in 4 hours

P, Q and R typist type in 1 hour

$$= \frac{216}{4} = 54 \text{ pages}$$

Let the number of pages typed in one hour by P, Q and R = X, Y and Z respectively.

$$X + Y + Z = 54 \quad \text{.....(i)}$$

$$Z - Y = Y - X$$

$$2Y = X + Z \quad \text{.....(ii)}$$

$$5Z = 7X$$

Now, from equation (i)

$$\frac{5}{7} Z + \frac{6}{7} Z + Z = 54$$

$$\frac{18}{7} Z = 54$$

$$Z = 21 \text{ pages}$$

$$Y = \frac{6}{7} \times 21 = 18 \text{ pages}$$

$$X = \frac{5}{7} \times 21 = 15 \text{ pages}$$

24. (c) Ronald working for 1 hour

$$= \frac{32}{6} = \frac{16}{3} \text{ pages}$$

Elan working for 1 hour

$$= \frac{40}{5} = 8 \text{ pages}$$

both together type for 1 hour

$$= \frac{16}{3} + 8 = \frac{40}{3} \text{ pages}$$

Both together type 110 pages

$$= \frac{110 \times 3}{40} = \frac{33}{4} \text{ hours}$$

$$= 8 \frac{1}{4} \text{ hours,}$$

8 hours 15 minutes

25. (c) A and B together can com-

$$\text{plete the work} = \sqrt{8 \times \frac{9}{2}} = \sqrt{36} =$$

6 hours

26. (a) P $\rightarrow 12 \times 8 = 96$ hours $\xrightarrow{5}$
 Q $\rightarrow 8 \times 10 = 80$ hours $\xrightarrow{6}$ 480

Total efficiency of one hour

$$= 5 + 6 = 11$$

Both together complete the work

$$= \frac{480}{11} \text{ hours}$$

Both together complete the work in 8 hours a day

$$= \frac{480}{11} \times \frac{1}{8} = \frac{60}{11} = 5 \frac{5}{11} \text{ days}$$

27. (b)

$$\begin{array}{l} A + B \rightarrow 12 \xrightarrow{5} \\ B + C \rightarrow 15 \xrightarrow{4} \\ C + A \rightarrow 20 \xrightarrow{3} \end{array} \rightarrow 60$$

Efficiency of A, B and C in one day = $\frac{5+4+3}{2} = 6$

(A + B) work for 5 days = $5 \times 5 = 25$
 Remaining work will be completed = $\frac{35}{4}$

Total days = $5 + \frac{35}{4} = \frac{55}{4}$
 $= 13\frac{3}{4}$ days

28. (c)

$$\begin{array}{l} A + B \rightarrow 8 \xrightarrow{3} \\ B + C \rightarrow 12 \xrightarrow{2} \\ A + B + C \rightarrow 6 \xrightarrow{4} \end{array} \rightarrow 24$$

(A + C)'s efficiency of one's day = $(4 \times 2) - 3 - 2 = 3$
 (A + C)'s complete the work = $\frac{24}{3} = 8$ days

29. (c)

$$\begin{array}{l} A + B \rightarrow 72 \xrightarrow{5} \\ B + C \rightarrow 120 \xrightarrow{3} \\ A + C \rightarrow 90 \xrightarrow{4} \end{array} \rightarrow 360$$

Total efficiency of one days = $\frac{5+3+4}{2} = 6$

A's one day efficiency = $6 - 3 = 3$
 A complete the work in = $\frac{360}{3} = 120$ days

30. (a)

$$\begin{array}{l} A + B \rightarrow 5 \xrightarrow{28} \\ B + C \rightarrow 7 \xrightarrow{20} \\ A + C \rightarrow 4 \xrightarrow{35} \end{array} \rightarrow 140$$

A, B and C one day efficiency = $\frac{28+20+35}{2} = \frac{83}{2}$

A's one day efficiency = $\frac{83}{2} - 20 = \frac{43}{2} = 21.5$

B's one day efficiency = $\frac{83}{2} - 35 = \frac{13}{2} = 6.5$
 C's one day efficiency = $\frac{83}{2} - 28 = \frac{27}{2} = 13.5$

A's one's days efficiency is maximum, So A will complete the work in Least time among them.

A = $140 \times \frac{2}{43} = \frac{280}{43} = 6\frac{22}{43}$ days

31. (c)

$$\begin{array}{l} A + B \rightarrow 10 \xrightarrow{5} \\ C \rightarrow 50 \xrightarrow{1} \end{array} \rightarrow 50$$

Then efficiency of A = B + C also equal

B's = X
 $5 - X = X + 1$
 $X = 2$

B completed the work = $\frac{50}{2} = 25$ days

32. (a)

	A	B
Efficiency Ratio	$\rightarrow 2$	$\rightarrow 1$
	$\rightarrow 1$	$\rightarrow 2$
	$\downarrow$	$\downarrow \times 6$
		12 (given)

Total work = 12×1 units

work done by (A + B) = $\frac{12}{3} = 4$ days

Note: Efficiency Ratio is inversely proportionate to the

time Ratio. $\left[E \propto \frac{1}{T} \right]$

33. (b)

	A	B
Efficiency Ratio	$\rightarrow 3$	$\rightarrow 1$
Time Ratio	$\rightarrow 1$	$\rightarrow 3$

[Time is Inversely proportion to efficiency]

Difference of Time (3 - 1) $\rightarrow 60$
 $2 \rightarrow 60$

$1 \rightarrow 30$ (A's days)

$3 \rightarrow 90$ (B's days)

Together to complete the work

= $\frac{90}{3+1} = \frac{90}{4} = 22\frac{1}{2}$ days

34. (b)

	A	B
Efficiency Ratio	$\rightarrow 7$	$\rightarrow 4$

Total work = $(7 + 4) \times 7 = 77$
 A's alone to finish the work = $\frac{77}{7} = 11$ days

35. (a)

	A	B
Time Ratio	$\rightarrow 6$	$\rightarrow 4$
	$\rightarrow 3$	$\rightarrow 2$
Efficiency Ratio	$\rightarrow 2$	$\rightarrow 3$

Total work = $(2 + 3) \times 18 = 90$
 B alone finish the work = $\frac{90}{3} = 30$ days

36. (a)

	Ashish	Manoj
efficiency Ratio	$\rightarrow 3$	$\rightarrow 2$

Chetan work for one day = $\frac{3+2}{2} = \frac{5}{2}$

Ashish	Manoj	Chetan
3	2	$\frac{5}{2}$

Efficiency Ratio $\rightarrow 6 : 4 : 5$
 efficiency

$\propto \frac{1}{\text{time}}$

Time Ratio $\rightarrow 10 : 15 : 12$
 $\downarrow$
 40

$\therefore 12$ Units = 40

$\therefore 15$ Units = $\frac{40}{12} \times 15 = 50$

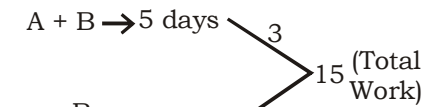
10 Units = $\frac{40}{12} \times 10 = \frac{100}{3}$

$$\begin{array}{l} \text{Ashish} \rightarrow \frac{100}{3} \xrightarrow{6} \\ \text{Manoj} \rightarrow 50 \xrightarrow{4} \\ \text{Chetan} \rightarrow 40 \xrightarrow{5} \end{array} \rightarrow 200$$

All together complete the work

= $\frac{200}{15} = \frac{40}{3} = 13\frac{1}{3}$ days

37. (d)



$$A + B = 3 \text{ Units} \quad \dots (i)$$

$$2A + \frac{B}{3} = 5$$

$$6A + B = 15 \text{ Units} \quad \dots (ii)$$

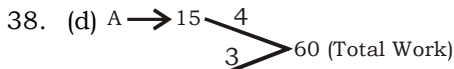
Subtracting (i) from (ii)

$$5A = 12 \text{ units}$$

$$A = \frac{12}{5} \text{ units}$$

$$\text{efficiency of A} = \frac{12}{5} \text{ units}$$

$$\text{Time taken by A to complete the work} = \frac{15}{\frac{12}{5}} \Rightarrow \frac{75}{12} = \frac{25}{4} \text{ days}$$



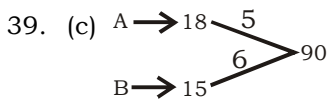
Total efficiency of A and B in one day = $4 + 3 = 7$

$$\text{Both together work for 4 days} = 7 \times 4 = 28$$

$$\text{Remaining work} = 60 - 28 = 32$$

Fraction of the remaining work

$$= \frac{32}{60} = \frac{8}{15}$$

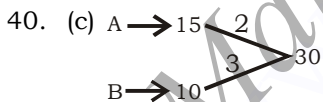


$$B's \text{ 10 day work} = 10 \times 6 = 60$$

$$\text{Remaining work} = 90 - 60 = 30$$

A completed the remaining

$$\text{work} = \frac{30}{5} = 6 \text{ days}$$



Both together 2 days work

$$= 2 \times (2 + 3) = 10$$

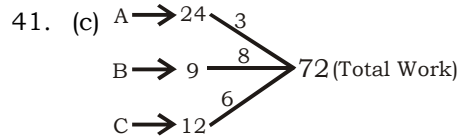
$$\text{Remaining work} = 30 - 10 = 20$$

A alone completed the remain-

$$\text{ing work} = \frac{20}{2} = 10 \text{ days}$$

Whole work is completed

$$= 10 + 2 = 12 \text{ days}$$



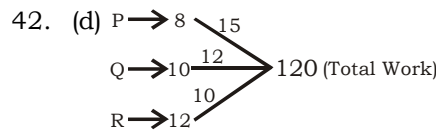
B and C three days work

$$= 3 \times (8 + 6) = 42$$

$$\text{Remaining work} = 72 - 42 = 30$$

Remaining work done by A

$$= \frac{30}{3} = 10 \text{ days}$$



All together work for 2 hours

$$= (15 + 12 + 10) \times 2 = 74$$

$$\text{Remaining work} = 120 - 74 = 46$$

Remaining work will be fin-

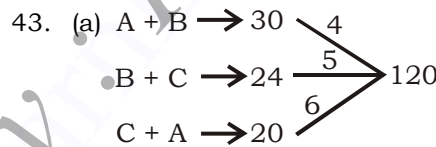
$$\text{ished by Q and R} = \frac{46}{12+10} = \frac{46}{22}$$

$$= 2 \text{ hours } 5 \text{ minutes}$$

(approximate)

$$11 : 00 \text{ a.m.} + 2 \text{ hours} = 1 \text{ p.m.}$$

One lakh Books will be print at 1 p.m.



Efficiency of one day A, B and C

$$= \frac{4+5+6}{2} = \frac{15}{2}$$

All together work for 10 days

$$= \frac{15}{2} \times 10 = 75$$

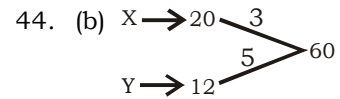
$$\text{Remaining work} = 120 - 75 = 45$$

A's one day efficiency

$$= \frac{15}{2} - 5 = \frac{5}{2}$$

A take to finish the work

$$= 45 \times \frac{2}{5} = 18 \text{ days}$$



$$X's \text{ 4 days work} = 4 \times 3 = 12$$

$$\text{Remaining work} = 60 - 12 = 48$$

Both together to finish the work

$$= \frac{48}{3+5} = \frac{48}{8} = 6 \text{ days}$$

$$\text{Total days} = 4 + 6 = 10 \text{ days}$$

$$45. (d) \text{ Remaining work} = 30 - 20 = 10 \text{ days}$$

A finished the remaining work = 20 days

A finished the whole work

$$= 20 \times \frac{30}{10} = 60 \text{ days}$$

$$46. (a) \text{ Remaining work}$$

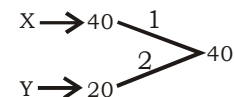
$$= 40 - 8 = 32 \text{ days}$$

Y finished the remaining work

$$= 16 \text{ days}$$

Y finished the whole work

$$= 16 \times \frac{40}{32} = 20 \text{ days}$$



Both together to finish the remaining work

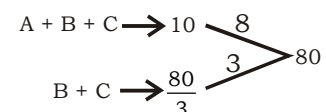
$$= \frac{40}{2+1} = \frac{40}{3} = 13\frac{1}{3} \text{ days}$$

$$47. (c) \text{ Remaining work} = 10 - 4 = 6 \text{ days}$$

B and C together to finish the remaining work = $10 - 4 + 10 = 16 \text{ days}$

B and C together to finish the whole work

$$= 16 \times \frac{10}{6} = \frac{80}{3} \text{ days}$$



$$A's \text{ one day efficiency} = 8 - 3 = 5$$

A alone can do the work in =

$$\frac{80}{5} = 16 \text{ days}$$

48. (c) A's $\frac{4}{5}$ work = 20 days

A's one work = $20 \times \frac{5}{4} = 25$ days

Together working for $\left(1 - \frac{4}{5} = \frac{1}{5}\right)$

work = 3 days

Together working for whole work = $3 \times 5 = 15$ days

A $\rightarrow 25 \xrightarrow{3} 75$ (Total Work)

A + B $\rightarrow 15 \xrightarrow{5} 75$ (Total Work)
B's one day efficiency = $5 - 3 = 2$

B's whole work to be completed
= $\frac{75}{2} = 37\frac{1}{2}$ days

49. (c) (A+B) completed the work in 30 days

A worked = 16 days

Remaining work will be completed by B in 44 days

A.T.Q

$(A + B) \times 30 = A \times 16 + B \times 44$

$30A + 30B = 16A + 44B$

$14A = 14B$

$\frac{A}{B} = \frac{1}{1}$

Now,

A+B worked 30 days his efficiency ratio is 1 : 1

So

total work = $30 \times (1+1) = 60$

$\therefore$ B finished the whole work

= $\frac{60}{1} = 60$ days

50. (b) A + B $\rightarrow 12 \xrightarrow{4} 48$
B + C $\rightarrow 16 \xrightarrow{3} 48$

According to the question,

$5(A+B) + 2(B+C) + 11C = 48$

A and B together 5 day's work
= $5 \times 4 = 20$

B and C together 2 days work
= $2 \times 3 = 6$

C's one day work

= $\frac{48 - 20 - 6}{13 - 2} = \frac{22}{11} = 2$

C's whole work completed

= $\frac{48}{2} = 24$ days

51. (c) A $\rightarrow 45 \xrightarrow{8} 360$ (Total Work)
B $\rightarrow 40 \xrightarrow{9} 360$ (Total Work)

B's 23 days work = $23 \times 9 = 207$

Starting work completed by A and B = $360 - 207 = 153$

A and B starting work completed in

= $\frac{153}{9+8} = \frac{153}{17} = 9$ days

Hence, A left after 9 days

52. (c) A $\rightarrow 14 \xrightarrow{3} 42$
B $\rightarrow 21 \xrightarrow{2} 42$

A's 3 days work = $3 \times 3 = 9$

Total work = $42 + 9 = 51$

Number of days

= $\frac{51}{3+2} = \frac{51}{5} = 10\frac{1}{5}$ days

53. (a) A $\rightarrow 24 \xrightarrow{6} 144$
B $\rightarrow 36 \xrightarrow{4} 144$
C $\rightarrow 48 \xrightarrow{3} 144$

All together work for 4 days

= $4 \times (6 + 4 + 3) = 52$

B's 3 days work = $3 \times 4 = 12$

A and B's together the work

= $\frac{144 - 52 - 12}{10} = \frac{80}{10} = 8$ days

Total number of days

= $4 + 8 + 3 = 15$ days

54. (c) A + B $\rightarrow 12 \xrightarrow{5} 60$
A $\rightarrow 20 \xrightarrow{3} 60$

B's one day efficiency = $5 - 2 = 3$

B's one day efficiency is half of

a day = $\frac{2}{2} = 1$

Both together complete the

work = $\frac{60}{3+1} = \frac{60}{4} = 15$ days

55. (d) A $\rightarrow 16 \xrightarrow{3} 48$
B $\rightarrow 12 \xrightarrow{4} 48$

Total efficiency of (Alternate) 2 days = $3 + 4 = 7$

Total efficiency of 12 days

= $7 \times 6 = 42$

13th day (A's work) = $42 + 3 = 45$

Remaining work = $48 - 45 = 3$

B completed remaining work = $\frac{3}{4}$

Total number of days = $13\frac{3}{4}$ days

56. (b) A $\rightarrow 11 \xrightarrow{20} 220$
B $\rightarrow 20 \xrightarrow{11} 220$
C $\rightarrow 55 \xrightarrow{4} 220$

A's 2 days work with the help of B and C on alternate days

= $20 + 20 + 11 + 4 = 55$

Whole work will be completed

= $\frac{220}{55} \times 2$ [Alternate days]

= 8 days

57. (b) A $\rightarrow 20 \xrightarrow{3} 60$
B $\rightarrow 30 \xrightarrow{2} 60$
C $\rightarrow 60 \xrightarrow{1} 60$

All together working on 3 days (A work 3 days and B and C help on third day)

= $3 + 3 + 3 + 2 + 1 = 12$

Whole work will be completed

= $\frac{60}{12} \times 3 = 15$ days

58. (c) A $\rightarrow 20 \xrightarrow{3} 60$
B $\rightarrow 15 \xrightarrow{4} 60$

Both together work for 6 days

= $6 \times (3 + 4) = 6 \times 7 = 42$

Remaining work = $60 - 42 = 18$

A and C's one day efficiency

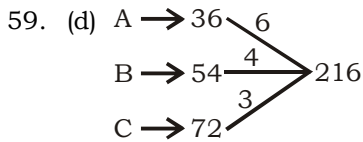
= $\frac{18}{4} = \frac{9}{2} = 4.5$

C's one's days efficiency

= $\frac{9}{2} - 3$ (C's efficiency) = $\frac{3}{2}$

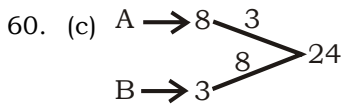
C alone finished the work

= $60 \times \frac{2}{3} = 40$ days

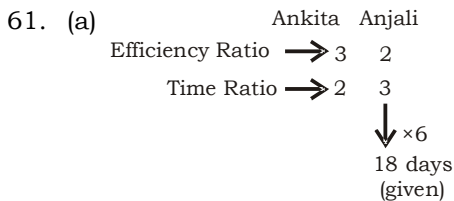


A's 8 days work = $8 \times 6 = 48$
 B's 12 days work = $12 \times 4 = 48$
 Work done by A, B and C
 = $216 + 48 + 48 = 312$
 Number of days A, B and C
 together working

$$= \frac{312}{6+4+3} = \frac{312}{13} = 24 \text{ days}$$



A's 6 days work = $6 \times 3 = 18$
 B's 2 days work = $8 \times 2 = 16$
 Lost work = $18 - 16 = 2$
 Remaining work = $24 - 2 = 22$
 A's alone done the work
 = $\frac{22}{3} = 7\frac{1}{3}$ days



Ankita = $2 \times 6 = 12$ days
 Total work = $18 \times 2 = 36$ units
 Last 5 days both work together
 = $5(3 + 2) = 25$
 Remaining work = $36 - 25 = 11$
 Time taken by Ankita
 = $\frac{11}{3} = 3\frac{2}{3}$ days

62. (d) Let the efficiency of Rakesh Yadav (RY), Bhuvnesh (B) and Pawan (P) is x, y and z units/day respectively.

According to the question :-

Case (I):-

$$5x + 2y + 3z = 6y + 6z \quad \dots (i)$$

Case (II):-

$$\begin{aligned} 2(y + z) &= 3x \\ 2y &= 3x - 2z \\ 4y &= 6x - 4z \quad \dots (ii) \end{aligned}$$

from equation (i) & (ii)

$$6x - 4z = 5x - 3z$$

$$x = z \quad \dots (iii)$$

From equation (ii) & (iii)

$$4y = 6x - 4x$$

$$\Rightarrow 4y = 2x$$

$$\Rightarrow x = 2y \quad \dots (iv)$$

Now similarly from (i) & (iii) & (iv)

Let assume $x = 2, y = 1, z = 2$

$$\begin{aligned} \therefore \text{Total work} &= (6y + 6z) \\ &= 6 \times 1 + 6 \times 2 = 18 \text{ units} \\ \text{Required time for Rakesh Yadav} \\ &= \frac{18}{2} = 9 \text{ days} \end{aligned}$$

$$\begin{aligned} \text{Required time for Bhuvnesh} \\ &= \frac{18}{1} = 18 \text{ days} \end{aligned}$$

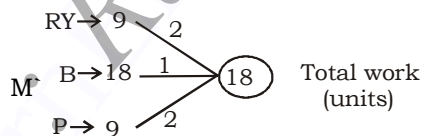
Required time for Pawan

$$= \frac{18}{2} = 9 \text{ days}$$

Hence option (d) is correct.

Note: In such type of question take help from options and then satisfy the question condition to save your valuable time.

option (d)



According to the question :-

Case (I):-

$$2 \times 5 + 1 \times 2 + 3 \times 2 = 18 \text{ units}$$

Condition (I) is satisfy similarly we can satisfy the other conditions also.

63. (b) Let A and B are two typists.

$$(A+B) = 6 \text{ min} \text{ --- } 100\% \text{ (work).}$$

$$\dots (i)$$

$$A 4 \text{ min} + B 6 \text{ min} \text{ --- } 80\%$$

$$\dots (ii)$$

Now,

$$(i) - (ii)$$

$$A 2 \text{ min} = 20\%$$

$$\therefore A 6 \text{ min} = 60\%$$

Now we can say $B < A$

$$\therefore B \text{ will work in } 6 \text{ min} = 40\%$$

So, B complete the work alone

$$= \frac{6}{40} \times 100 = 15 \text{ mins.}$$

$$64. (d) \quad \frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}$$

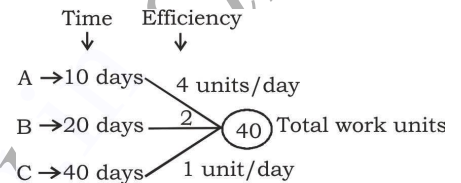
According to the question :

$$\frac{(x-1)(x+1)}{(x+2)(x-1)} = \frac{9}{10}$$

$$10x + 10 = 9x + 10$$

$$x = 8$$

65. (a)



In the first three days work completed by (A+B+C)

$$= 4 + 2 + 1 = 7 \text{ units}$$

Hence in 15 days they are able to do = $7 \times 5 = 35$ units

On the 16th day A will do 4 unit of work and on the next day it

will take $\frac{1}{2}$ day to B to finish

the remaining one unit work.

Hence total no. of days

$$= 15 + 1 + \frac{1}{2} = 16\frac{1}{2} \text{ days.}$$

66. (d) In half an hour, Needles made by A

$$= \frac{1}{4} \times 12000 = 3000$$

Needles made by B

$$= \frac{1}{8} \times 12000 = 1500$$

Needles made by C

$$= \frac{1}{6} \times 12000 = 2000$$

Working for $1\frac{1}{2}$ hour one by

one each for $\frac{1}{2}$ hour

can make needles

$$= 3000 + 1500 + 2000 = 6500$$

In the next $1\frac{1}{2}$ hours no. of

needles = 6500

So, in 3 hours no. of needles made = 13000

Now, A will work for $\frac{1}{2}$ hour and make needles = 3000

B will work for next $\frac{1}{2}$ hour making needles = 1500

Total needles in 4 hours = 17500

So, Time taken by C to make

1000 needles = $\frac{1}{4}$ hours.

Hence total time to make

18500 needles = $4\frac{1}{4}$ hours

67. (d) Let total work equals to 20 units so A + B do 1 unit a day. In 5 day (A + B)'s work = 5 units
Remaining work = 15 units
Efficiency of (A + B + C)

$$= \frac{3}{2} \text{ units/day}$$

$$\text{Efficiency of C} = \frac{3}{2} - 1$$

$$= \frac{1}{2} \text{ unit/day}$$

But also given $3B = 2C$

$B : C = 2 : 3 \Rightarrow$ Efficiency of B

$$= \frac{2}{3} \times \frac{1}{2} = \frac{1}{3}$$

Hence efficiency of A = $\frac{2}{3}$

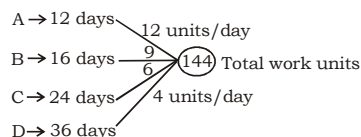
So, Time taken by them separately:-

$$A = \frac{20}{2/3} = 30 \text{ days.}$$

$$B = \frac{20}{1/3} = 60 \text{ days.}$$

$$C = \frac{20}{1/2} = 40 \text{ days.}$$

68. (a)



Work done on first day = 12 units

Work done on second day

= 12 + 9 = 21 units

Work done on third day

= 21 + 6 = 27 units

Work done on fourth day

= 27 + 4 = 31 units

Work done on fifth day

= 31 units and so on.

Hence work in five days

= 122 units

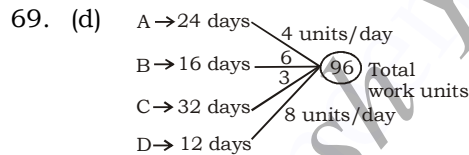
Remaining work

= 144 - 122 = 22 units

Required time = $\frac{22}{31}$ days

Hence total time to complete

the work = $5\frac{22}{31}$ days



On the first day work done = 4 units

On the second & third day work done = $2 \times (4 + 9) = 26$ units

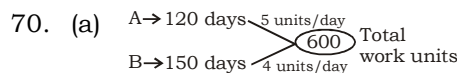
Total units done in 3 days = 30 units

Remaining work is done by B, C and D. If we add 2 days work of B and 4 days work of C in the remaining work. Then B, C and D will do the remaining work for whole days.

Remaining work = 66 units

Adding extra work of B and C then work = $66 + 12 + 12 = 90$ units

Required time = $\frac{90}{17} = 5\frac{5}{17}$ days



Work done in first 20 days

= $20 \times 9 = 180$ units

Work done in next 12 days

= $12 \times 5 = 60$ units

Remaining work after 32 days

= $600 - 240 = 360$ units

These 360 units has been done by A and C in 48 days

So, Efficiency of A + C

$$= \frac{360}{48} = 7\frac{1}{2} \text{ units/day}$$

Efficiency of C

$$= 7\frac{1}{2} - 5 = 2\frac{1}{2} \text{ units/day}$$

Time take by C to complete the

$$\text{work} = \frac{600}{2\frac{1}{2}} = \frac{600}{5} \times 2$$

= **240 days**

71. (d) Let the initial number of men = x

Then according to the question:-

$$30 \times 6 \times x = 20 \times 8 \times (x + 4)$$

$$x = 32$$

72. (b) Part of the work

$$\left[4 - \frac{5}{1 + \frac{1}{3 + \frac{4}{9}}} \right]^{th}$$

$$= \left[4 - \frac{5 \times 31}{31 + 9} \right]$$

$$\Rightarrow \frac{160 - 155}{40} = \frac{1}{8}$$

According to the question:-

$$\frac{1}{8} \text{ th work done} = 10 \text{ min}$$

Total work done = 80 min

$$\frac{3}{5} \text{ th of the work done}$$

$$= 80 \times \frac{3}{5} = \mathbf{48 \text{ min}}$$

73. (a) Let the total work = 100 %

According to the question :

work done by A + B = 80 %

$$\therefore \text{work done by C} = \text{Total work} - \text{work done by (A + B)}$$

$$\text{work done by C} = 100 - 80 = 20 \%$$

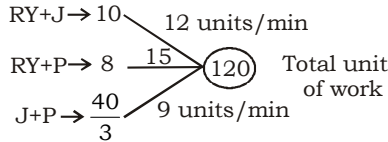
Similarly :-

$$\text{Work done by A} = (100 - 55) = 45 \%$$

$$\text{Remaining work [which is done by B]} = 100 - (45 + 20) = 35 \%$$

So A is the most efficient.

74. (a) Let the Rakesh Yadav is represented by RY, Jitu by J and Pawan by P.



Efficiency of (RY + J + P)

$$= \frac{(12 + 15 + 9)}{2} = 18 \text{ units/hr}$$

$$50 \% \text{ of the work} = 120 \times \frac{50}{100} = 60 \text{ units}$$

Required time for (RY + J) to

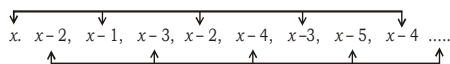
$$\text{complete the work} = \frac{60}{12} = 5 \text{ hours}$$

$$\text{Remaining work} = (120 - 60) = 60 \text{ units}$$

$$\text{Required time for P} = \frac{60}{6} = 10 \text{ hours}$$

Total time in completion of work = 10 + 5 = 15 hours

75. (b) Let the number of workers = x
According to the question :-
Work done in 9 days
 $\therefore$ Total work = $9x$



up to 18 days.

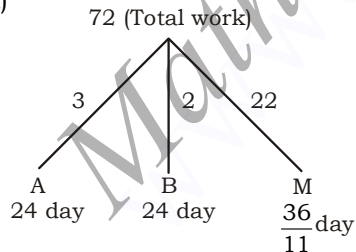
There are two A.P series:-

$$\therefore [x + x-1 + x-2 + \dots + x-8] + [x-2 + x-3 + \dots + x-10] = 9x$$

$$9x - 36 + 9x - 54 = 9x$$

$$9x = 90 \Rightarrow x = 10$$

76. (a)



$$\Rightarrow 2(A+B+C) = M$$

$$2(3 + 2 + C) = 22$$

$$C = 6$$

$$\Rightarrow C \text{ would complete the whole work alone in } = \frac{72}{6} = 12 \text{ days}$$

77. (a) According to the question:

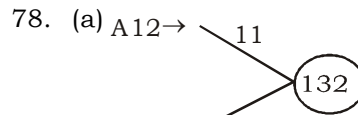
$$A : B : C \\ E \rightarrow 2 : 4 : 3$$

Total work = $40 \times 3 = 120$ units

Required time for (A + B + C)

$$= \frac{120}{(2 + 4 + 3)}$$

$$= \frac{120}{9} = 13\frac{1}{3} \text{ days}$$



Togetherly (A + B) can add
= (11 + 12) = 23 bricks/hour
According to the question :-
They build the wall in 4 hours :-

$$\therefore \text{per hour work} = \frac{132}{4}$$

$$= 33 \text{ bricks/hour}$$

$$(33 - 23) \text{ units} \rightarrow 300 \text{ bricks}$$

$$10 \text{ units} \rightarrow 300 \text{ bricks}$$

$$1 \text{ unit} \rightarrow \frac{300}{10} \text{ bricks}$$

$$132 \text{ units} \rightarrow 30 \times 132$$

$$= 3960 \text{ bricks}$$

79. (b) 1st Shift : 2nd Shift : 3rd Shift
Effic → 80 : 70 : 50
iciency 8 : 7 : 5

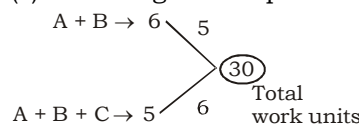
According to the question:-

$$\text{Total work} = 8 \times 60 = 480 \text{ units}$$

$$\text{Required time} = \frac{480}{(8 + 7 + 5)}$$

$$= \frac{480}{20} = 24 \text{ days}$$

80. (a) According to the question :-



$$\text{Efficiency of C} = \text{Eff. of (A+B+C)} - \text{Eff. of (A+B)}$$

$$= 6 - 5 = 1 \text{ unit/day}$$

$$A + C : B + C$$

$$\text{Time} \rightarrow \left(x - 2\frac{1}{2}\right) : x$$

Note:- C is working in both cases (A + C) and (B + C) with equal efficiency but (A + C) take

less time so we can say A is efficient than B.

$\Rightarrow$ for quick response assume efficiency as:-

$$A + B = 5$$

(From above Result)

$$A = 3, B = 2 (A > B)$$

Now satisfy the condition as :-
Time taken by (A + C) to com-

$$\text{plete the work} = \frac{30}{4} = 7.5 \text{ days}$$

Time taken by (B + C) to

$$\text{complete the work} = \frac{30}{3} = 10 \text{ days}$$

Difference in time is same as mention in question so assumed efficiency is correct.

$$\text{Required time for A} = \frac{30}{3} = 10 \text{ days}$$

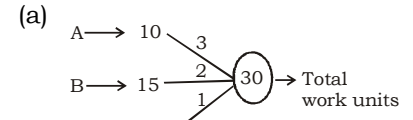
$$\text{Required time for B} = \frac{30}{2} = 15 \text{ days}$$

$$\text{Required time for C} = \frac{30}{1} = 30 \text{ days}$$

Alternatively:-

Note: In such type of questions go through options to save your valuable time. Then satisfy the question condition.

Option:-



Now satisfy all the question conditions:-

Required time for (A + B)

$$= \frac{30}{5} = 6 \text{ days}$$

Required time for (A + B + C)

$$= \frac{30}{6} = 5 \text{ days}$$

Required time for (A + C)

$$= \frac{30}{4} = 7.5 \text{ days}$$

Required time for (B + C)

$$= \frac{30}{3} = 10 \text{ days}$$

Difference in time of (A + C) and (B + C) = 10 - 7.5 = 2.5 days

so option (a) satisfy all the question condition hence option (a) is correct.

81. (b) According to the question :-

Condition (I) $B + C : A$
 $2 : 1 \rightarrow 3 \times 9$

Condition (II) $A + C : B$
 $19 : 8 \rightarrow 3 \times 9$

∴ We know the efficiency in both the conditions will be same, so equal both the conditions.

Now new Ratio of efficiencies:-

$$\begin{array}{l|l} A : B + C & A + C : B \\ 9 : 18 & 19 : 8 \end{array}$$

∴ Efficiency of A = 9
 Efficiency of B = 8
 Efficiency of C = 10

∴ Total work = $\frac{40}{3} \times (9 + 8 + 10)$
 = 360 units
 Required time for B

= $\frac{360}{8} = 45$ days

82. (a) Time taken by Rakesh Yadav to complete the work
 = $4 \times 3 = 12$ days

Time taken by Jitu = $\frac{3 \times 6}{2}$

= 9 days $\left[\because 66\frac{2}{3}\% = \frac{2}{3} \right]$

Time taken by pawan = $\frac{5 \times 10}{2}$
 = 25 days

Rakesh yadav $\rightarrow 12$
 Jitu $\rightarrow 9$
 Pawan $\rightarrow 25$
 Total work units = 900

3 days work = 211

$\downarrow \times 4$ $\downarrow \times 4$

12 days 844

Remaining work = $(900 - 844)$
 = 56 units

13th day Rakesh Yadav will work.

So required time = $\frac{56}{75}$ days

Total time = $12 + \frac{56}{75} = 12\frac{56}{75}$ days

83. (a)

Efficiency :- $A : B : C$
 $2 : 3 : 4$

According to the question :-

A and C work in alternate days it means Both A and C worked for 5 days.

$$\begin{array}{l|l|l} A : B : C & & \\ 2 : 3 : 4 & & \\ \downarrow \times 5 & \downarrow \times 10 & \downarrow \times 5 \\ 10 : 30 : 20 & & \end{array}$$

Share of A = $\frac{1200}{(10 + 30 + 20)} \times 10$
 = 200 Rs.

Share of B = $\frac{1200}{60} \times 30 = 600$ Rs.

Share of C = $\frac{1200}{60} \times 20 = 400$ Rs.

Note:- To save your valuable time take help from options.

As option (a) Ratio of wages
 = $10 : 30 : 20$
 = $1 : 3 : 2$

Check which option gives the same ratio.

84. (a) $A + B \rightarrow 16$
 $B + C \rightarrow 24$
 Total work units = 48

According to the question :-

We arrange the work of A, B and C in such a way:-

$$(A + B) + (B + C) + C$$

$\downarrow \quad \downarrow \quad \downarrow$

4 days 3 days 20 days

∴ C worked for 23 days, 3 days he worked with B.

So remaining days

= $(23 - 3) = 20$ days

Work done by (A + B) in 4 days
 = $4 \times 3 = 12$ units

Work done by (B + C) in 3 days
 = $3 \times 2 = 6$ units

Remaining work = $(48 - 18)$
 = 30 units

Required time for C to complete

the work = $\frac{20}{30} \times 48 = 32$ days

85. (a)

Time :- Rakesh Yadav : Jitu : Pawan
 $15 : 5 : 1$
 $\downarrow \quad \downarrow \quad \downarrow$
 $1 \quad 3 \quad 15$

Efficiency :- $1 : 3 : 15$
 Now total work = $(1 + 3 + 15) \times 30$

= 570 units

Required time for Rakesh

Yadav = $\frac{570}{1} = 570$ days

Required time for Jitu

= $\frac{570}{3} = 190$ days

Required time for Pawan

= $\frac{570}{15} = 38$ days

Alternatively:-

In such type of questions take help from options to save your valuable time.

Option (a):-

Remember according to the question the ratio of time would be:-

$15 : 5 : 1$

Check which option follow it. That will be your answer.

86. (a) **Note:-** Follow the similar process which we have mentioned in earlier question.

$A : B$
 $1 : 4$
 $\swarrow \quad \searrow$
 $3 : 5$
 $5 : 12$
 Given Ratio of work
 Given Ratio of time
 Actual Ratio of Efficiency

Now Total work = $(5 + 12) \times 24$
 = 17×24 units

Required time for A to complete

the work = $\frac{408}{5} = 81\frac{3}{5}$ days

87. (d) Bucket P : Bucket Q

Efficiency : $3 : 1$

according to the question:

capacity of the drum = 3×60
 = 180 units

when Both the buckets poured together then required times

= $\frac{180}{4} = 45$ times

88. (b) Speed of the first vehicle

$$= \frac{3}{5} \text{ tons/min.}$$

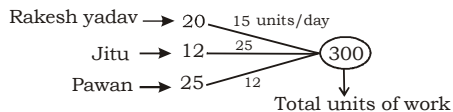
Speed of the second vehicle

$$= \frac{1}{2} \text{ ton/min.}$$

Required time for Both to carry 33 tons

$$= \frac{33}{\frac{3}{5} + \frac{1}{2}} = \frac{33 \times 10}{6+5} = 30 \text{ min.}$$

89. (a)



The Ratio of the work done by RakeshYadav, Jitu and Pawan

$$\begin{aligned} &= 15 \times \frac{16}{3} : 25 \times 4 : 12 \times 10 \\ &= 80 : 100 : 120 \\ &= 4 : 5 : 6 \end{aligned}$$

According to the question total amount = Rs. 1800

Share of Rakesh Yadav

$$= \frac{1800}{15} \times 4 = 480 \text{ Rs.}$$

$$\text{Share of Jitu} = \frac{1800}{15} \times 5 = 600 \text{ Rs.}$$

$$\begin{aligned} \text{Share of Pawan} &= \frac{1800}{15} \times 6 \\ &= 720 \text{ Rs.} \end{aligned}$$

90. (a) $A + B + C \rightarrow 36$ days (Given)

according to the question :

Condition (I) $A+B : C$

$$2 : 1$$

Condition (II) $A+C : B$

$$3 : 1$$

We know the efficiency of A,B and C will be equal in both the conditions (i) & (ii) as:-

$$\begin{aligned} A+B : C & \quad A+C : B \\ 2_{\times 4} : 1_{\times 4} \rightarrow 3_{\times 4} & \quad 3_{\times 3} : 1_{\times 3} \rightarrow 4_{\times 3} \\ 8 : 4 \rightarrow 12 & \quad 9 : 3 \rightarrow 12 \end{aligned}$$

Now total work = $36 \times 12 = 432$ units

$$A : B : C$$

$$\text{Efficiency} \rightarrow 5 : 3 : 4$$

(From above details)

Required time for A

$$= \frac{432}{5} = 86 \frac{2}{5} \text{ days}$$

$$\text{Required time for B} = \frac{432}{3} = 144 \text{ days}$$

$$\text{Required time for C} = \frac{432}{4} = 108 \text{ days}$$

91. (c) Number of pages typed by A, B and C together per day

$$= \frac{900}{20} = 45 \text{ pages/day}$$

according to the question,

Condition (i) : $B - A = C - B$

$$2B = A + C \quad \dots (i)$$

Condition (ii) : $A \times 4 = C \times 1$

$$\frac{A}{C} = \frac{1}{4}$$

$$A : C = x : 4x \quad \dots (ii)$$

from (i) & (ii)

$$x + 4x + 2.5x$$

$$= 45 \left[\therefore B = \frac{x + 4x}{2} = 2.5x \right]$$

$$x = 6$$

$$\text{Pages typed by C} = 4x = 4 \times 6 = 24$$

per hour typed pages by C

$$= \frac{24}{8} = 3$$

92. (d) In such type of questions please take help from options to save your valuable time.

as option (d) : Time taken by Benne to complete the work = 6 days

According to the question,

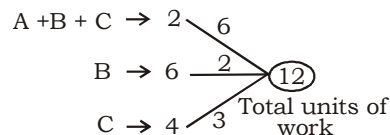
Time taken by Anne (A), Benne

$$(B) \text{ and Cenne (C)} = \frac{6}{3} = 2 \text{ days}$$

Condition (i):-

Benne takes 2 days more than time taken by Cenne = $6 - 2 = 4$ days

Now:



$$\text{efficiency of Enne} = 6 - (3 + 2) = 1$$

Now try to satisfy the question condition (ii) on the basis of this data. Anne's 6 days work = $1 \times 6 = 6$ units

Benne's 3 days work = $3 \times 2 = 6$ units

So, total work = 12 units

So, option (d) is correct because it satisfy all the conditions.

93. (d) Let the efficiency of Henry = x
Let the efficiency of Ford = y
according to the question:-

$$10(x+y) = \left(\frac{x}{2} + 5y \right) \times 5$$

$$2x + 2y = \frac{x}{2} + 5y$$

$$\frac{3x}{2} = 3y \Rightarrow \frac{x}{y} = \frac{2}{1}$$

$$\Rightarrow x : y = 2 : 1$$

Now total work = $3 \times 10 = 30$ units

Required time for ford

$$= \frac{30}{1} = 30 \text{ days}$$

94. (b) Time taken by pascal and Rascal = 10 hours..... (Given)

according to the question

Let efficiency of Pascal = x

Let efficiency of Rascal = y

$$2.5x + 8.5y = \frac{10(x+y)}{2}$$

$$2.5x + 8.5y = 5x + 5y$$

$$2.5x = 3.5y$$

$$\frac{x}{y} = \frac{3.5}{2.5} = \frac{7}{5}$$

$$\text{Efficiency} \rightarrow x : y = 7 : 5$$

Total work = $(7+5) \times 10 = 120$ units

Time taken by pascal

$$= \frac{120}{7} = 17 \frac{1}{7} \text{ hours.}$$

95. (d) Time taken by Milinda and

$$\text{Bill together} = \sqrt{\frac{25 \times 16}{3 \times 3}} = \frac{20}{3}$$

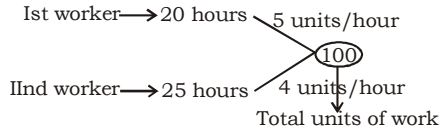
hours

Time taken by Bill

$$= \frac{20}{3} + \frac{16}{3} = 12 \text{ hours.}$$

96. (c) **Note** : In such type of questions we should take help from options to response quickly and to save our valuable time.

Go through option (c)



Note:- Now satisfy all the conditions according to the question.

Condition (I):-

work done by the Ist worker in 7 hours = $5 \times 7 = 35$ units

work done by the second worker in 5 hours = $5 \times 4 = 20$ units

Total work done = $35 + 20 = 55$ units

Remaining work = $100 - 55 = 45$ units

according to question,

$$\text{remaining work} = 100 \times \frac{9}{20}$$

= 45 units

Condition (Ist) satisfy.

similarly condition (II) : work done by the first worker in 2 hours = $5 \times 2 = 10$ units

Now they will work together then, required time for remaining work

$$= \frac{(100-10)}{(5+4)} = 10 \text{ days}$$

work done by the Ist worker in 10 days = $10 \times 5 = 50$ units

Total work done by the first worker till completion of the work = $10 + 50 = 60$ units

according to question : $100 \times \frac{60}{100} = 60$ units

So both the Conditions of the question satisfy so this option (c) is correct.

97. (d) Let the number of workers in the group = x

Then according to the question,

Condition (I):-

From the second day onwards, one worker was withdrawn each day.

$$\therefore \text{Total work} = x + (x-1) + (x-2) + \dots$$

$$\dots 1 = \frac{x(x+1)}{2}$$

Condition (II):-

When there is no worker withdrawn at any stage.

$$\text{Total work} = x \times x = x^2$$

Therefore,

$$\frac{x(x+1)}{2} = x^2 \times \frac{55}{100}$$

$$\Rightarrow 10x + 10 = 11x$$

$$\Rightarrow x = 10$$

Alternatively :

Note: To save your valuable time take help from options to quick response.

$$(10 + 9 + 8 + \dots + 1)$$

$$= 10 \times \left(10 \times \frac{55}{100}\right)$$

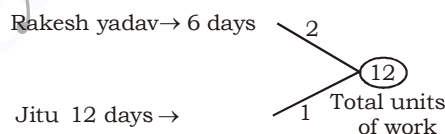
$$\Rightarrow 55 = 55$$

So option (d) is correct.

98. (c) 6 times of the actual work done by Rakesh yadav = 36 days
Actual work done by Rakesh

$$\text{yadav} = \frac{36}{6} = 6 \text{ days}$$

Time taken by Jitu to do actual work = 12 days.



according to the question,

Time taken by Rakesh yadav and Jitu to finish 3 times of actual work = $\frac{12 \times 3}{(2+1)} = 12$ days

99. (d) Ist person : IInd person

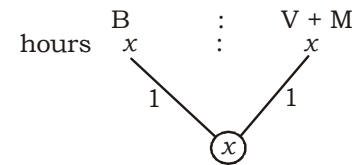
Efficiency → 1 : 2 [from question]

Now total work = $(1 + 2) \times 2 = 6$ units

Time taken by IInd person(faster)

$$= \frac{6}{2} = 3 \text{ days}$$

100. (c) according to the question,
Condition (I):-



Total number of days taken by

$$(B+V+M) = \frac{x}{2} \text{ hours} \dots (1)$$

Condition (II) V : V+M

hours: Y+8 : Y

Condition (III) B : V

hours Z : Z+8

Note: In Such type of questions please take help from options to save your valuable time.

Option (c):- Let (Brahma + Vishnu + Mahesh) will do the work = 6 hours

$$\text{from equation (I)} \quad \frac{x}{2} = 6$$

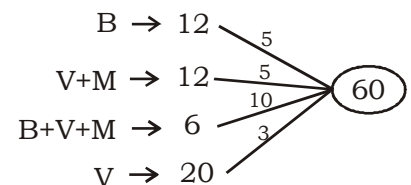
$$\Rightarrow x = 12 \text{ hours}$$

- $\therefore$ Time taken by Brahma = 12 hours

Time taken by (V+M) = 12 hours

Time taken by (B+V+M) = 6 hours

From (III) condition time taken by V = 20 hours



$$\begin{matrix} B & : & V & : & M \\ E \rightarrow & 5 & : & 3 & : & 2 \end{matrix}$$

Now try to satisfy the condition (II) on given values.

Time taken by (V+M)

$$= \frac{60}{(2+3)} = 12 \text{ hours}$$

$$\text{Time taken by (V)} = \frac{60}{3} = 20 \text{ hours}$$

Difference in time between (V+M) and V is 8 hours so it satisfy all the condition so option (c) is correct.

- 101.(b) Let the contractor initially employed x workers and estimated the completion of work in 100 days.

we know : $\frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}$

according to the question,

Let the x workers work for D days then the contractor doubled the workers.

$$D \times x + (100 - D) \times 2x = 175x$$

$$D = 25 \text{ days}$$

$$\text{work done in 25 days} = 25x$$

$$\text{Total work} = 175x$$

- $\therefore$ work done before increasing the number of workers

$$= \frac{25x}{175x} \times 100 = 14 \frac{2}{7} \%$$

- 102.(c) M_1 produces 400 bottles per minute.

Then one day's production = $400 \times 9 \times 60 = 216000$ bottles per day.

according to the question,

Ratio of time utilised by M_1 and $(M_1 + M_2)$

M_1	:	$(M_1 + M_2)$
1	:	2
$\downarrow \times 400$		$\leftarrow$ Time utilised (min)
400 bottles		$\downarrow \times (400+600)$
		2000 bottles $\leftarrow$ Production (bottles)

Thus, 2400 bottles can be produced = 3 minutes

1 bottle can be produced

$$= \frac{3}{2400}$$

216000 bottles can be produced

$$= \frac{3}{2400} \times 216000$$

$$= 270 \text{ minutes} = 4.5 \text{ hours}$$

- 103.(b) Let the capacity of the reservoir is V litre and the per day filling is x litre, then,

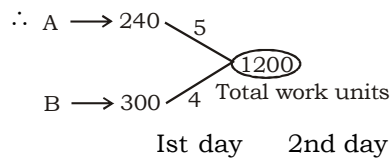
$$90x + V = 40000 \times 90 \quad \dots (i)$$

$$60x + V = 32000 \times 60 \quad \dots (ii)$$

after solving equation (i) & (ii), we get, $x = 56000$

hence 56,000 litres per day can be used without the failure of supply.

- 104.(b) **Note:-** Both A and B work 10 hours a day individually.



Morning Shift- A B

Evening Shift- B A

It is clear that in two days finally they work very similar to the alternate days i.e., finally A works for 10 hours and B also works for 10 hours.

days	:	work completed
2	:	90
$\downarrow \times 13$		$\downarrow \times 13$
26	:	1170

So, in 26 days they will complete 1170 units

Remaining work

$$= 1200 - 1170 = 30 \text{ units}$$

Now, it is the turn of A.

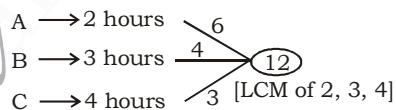
Since A does 50 units work in 10 hours

So he will do 30 units

$$= \frac{10}{50} \times 30 = 6 \text{ hours}$$

Thus, the work will be finished on 27th day.

- 105.(a)



In 12 hours shawls made by A = 6

In 12 hours shawls made by B = 4

In 12 hours shawls made by C = 3

i.e. In 12 hours they will weave 13 shawls

So in 84 hours they will weave 91 shawls

Now, in 9 hours A will make 4 Shawls

in 9 hours B will make 3 Shawls

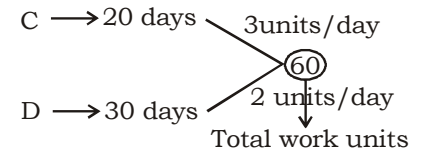
in 9 hours C will make 2 Shawls

total = 9 Shawls.

Order will be completed in $84+9 = 93$ hours

- 106.(b) A : B

Efficiency $\rightarrow$ 2 : 1



But according to the question the efficiency of $(A + B)$ is same as $(C + D)$:

A : B

$$2 : 1 \rightarrow 3 \times 5 \quad \dots (i)$$

C : D

$$3 : 2 \rightarrow 5 \times 3 \quad \dots (ii)$$

To equal the efficiency multiply by 5 in (i) & by 3 in (ii)

A : B

$$E \rightarrow 10 : 5$$

C : D

$$9 : 6$$

$$\text{Now total work} = 9 \times 20 = 180$$

$$\text{Required time for A} = \frac{180}{10}$$

$$= 18 \text{ days}$$

- 107.(c) C : A

$$\text{Efficiency} \rightarrow 2 : 1 \quad \dots (i)$$

B : C

$$\text{Time} \rightarrow 3 : 1$$

$$\text{Efficiency} \rightarrow 1 : 3 \quad \dots (ii)$$

from (i) & (ii),

A : B : C

$$\text{Efficiency} \rightarrow 3 : 2 : 6$$

$$\text{Total work} = 3 \times 12 = 36 \text{ units}$$

According to the question,

They worked in pairs as :

$$\frac{A+B}{5} \quad \frac{B+C}{8} \quad \frac{C+A}{9}$$

$$\text{Days} \rightarrow 1 \quad 2 \quad 3 \quad 4 \quad 5$$

$$\text{work} \rightarrow 5 \quad 8 \quad 9 \quad 5 \quad 8$$

Now 35 units of work completed in 5 days.

$$\text{Remaining work} = (36 - 35) = 1 \text{ unit}$$

$$\text{Required time} = \frac{1}{9} \text{ days}$$

$$\text{Total time} = 5 \frac{1}{9} \text{ days}$$

108. (b) A : B

Efficiency $\rightarrow$ 1 : 2

A takes 15 days to complete the work then, total work
 $= 1 \times 15 = 15$ units

According to the question,

Note: They completed the work in 11 days. It is clear A did the work for 11 days.

so work done by A $= 11 \times 1$

$= 11$ units

Remaining work $= (15 - 11)$

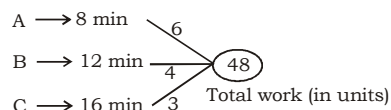
$= 4$ units

These remaining units of work is done by B then required time

for B $= \frac{4}{2} = 2$ days

So they worked together for 2 days.

109. (a)



Now we conclude $\rightarrow$ A, B and C takes 48 min to publish 13 books.

48 min $\longrightarrow$ 13 books

1 min $\longrightarrow \frac{13}{48}$ books

12 hours $\longrightarrow \frac{13}{48} \times 12 \times 60$

$= 195$ books

average number of books published by each $= \frac{195}{3} = 65$ books

110. (c) According to the question,

Man : Woman : Girl

Efficiency $\rightarrow$ 6 : 3 : 1

money received by (woman +

girl) $= \frac{10000}{10} \times 4 = \text{Rs. } 4000$

111. (b) According to the question,

$$\frac{(x-2)x}{100} = \frac{(x+7)(x-10)}{75}$$

Note:- Let the work is 100 units to make percentage calculation easier.

$$3x^2 - 6x = 4x^2 - 12x - 280$$

$$x^2 - 6x - 280 = 0$$

after solving $x = 20$

Then total work $= (20 - 2) \times 20$
 $= 360$ units

Time taken by $(x + 10)$ men to

finish the work $= \frac{360}{(20+10)}$

$= 12$ days.

112. (d) In $\frac{1}{6}$ hour 314 weavers

weave $= 6594$ shawls

In 1 hour 314 weavers weave

$= 6594 \times 6$ shawls

In 1 hour 1 weaver weave

$= \frac{6594 \times 6}{314}$ shawls $= 126$ shawls

113. (b) Let the total work done by

colonel, Major and General $= 17$

work done by Colonel and Major $= 8$

work done by Major and General $= 12$

$= 12$

now work done by Colonel

$= 17 - 12 = 5$

work done by General

$= 17 - 8 = 9$

work done by Major $= 12 - 9 = 3$

according to the question,

Total amount received by them

$= \text{Rs. } 816$

amount received by least efficient (Major)

$= \frac{816}{17} \times 3 = 48 \times 3 = \text{Rs. } 144$

114. (a) Let the total work done by (A

+ B + C) $= 100$ units

work done by A + B $= 70$ units

work done by B + C $= 50$ units

Now we calculate the efficiency of all the three

efficiency of A $= 100 - 50 = 50$

Efficiency of B $= 70 - 50 = 20$

Efficiency of C $= 100 - 70 = 30$

So we can say A is faster.

115. (d) from question,

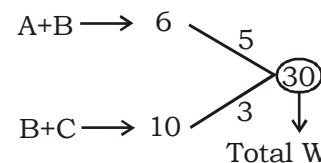
condition (i)

C : A

Days $\rightarrow 2x : x$

Efficiency $\rightarrow x : 2x$

Let the number of days taken by A and C are x and $2x$ respectively.



Now : Efficiency of (A + B) $= 5$ units/day

Efficiency of (B + C) $= 3$ units/day

according to condition (i)

$2x + B = 5$ (i)

$B + x = 3$ (ii)

after solving equation (i) and (ii)

$x = 2$

efficiency of A $= 2x = 2 \times 2 = 4$

Time required for A to complete

the work $= \frac{30}{4} = 7.5$ days

116. (b) According to the question,

Amount received by A $= 250$ Rs.

Amount received by B $= 100$ Rs.

Note : always remember amount always divide in the ratio of their efficiencies.

	A	:	B
	250	:	100
E $\rightarrow$	5	:	2
T $\rightarrow$	2	:	5
	+3		

3 units $\rightarrow 9$ days

1 unit $\rightarrow 3$ days

Time required for A $= 6$ days

Time required for B $= 15$ days

Total work $= 15 \times 2 = 30$ units

Required time for both (A and

B) $= \frac{30}{7} = 4\frac{2}{7}$ days.

117. (c) According to the question,

A : B : C

Days $\rightarrow x + 2 : x + 8 : x$

Now from question condition,

$$\frac{1}{x+2} + \frac{1}{x+8} = \frac{1}{x}$$

after solving $x = 4$

Time taken B to complete the work $= (4 + 8) = 12$ days

Alternatively:-

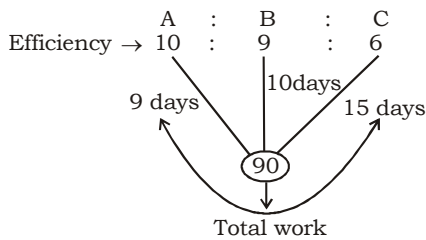
In such type of questions you can also find the value of x in such a way

$$x = \sqrt{2 \times 8} \Rightarrow x = 4 \text{ days}$$

Then time taken by B

$= (4 + 8) = 12$ days

118.(c) A : C
Efficiency → 5 : 3 ... (i)
B : C
Time → 2 : 3
Efficiency → 3 : 2 ... (ii)
from (i) and (ii)



Difference in number of days C and A = (15 - 9) = 6 units
from question, 6 units → 6 days

1 unit → 1 day

∴ Time taken by A = 9 × 1 = 9 days
Time taken by B = 10 × 1 = 10 days

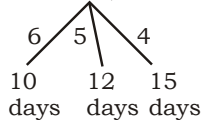
Time taken by C = 15 × 1 = 15 days

Work done by B and C in two days = 15 × 2 = 30 units

Remaining work
= (90 - 30) = 60 units

Required time for A = $\frac{60}{10} = 6$ days.

119.(c) 60 (Total work)



C's 3 days work = 4 × 3 = 12 units

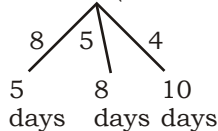
Remaining work = 60 - 12 = 48 units

B's 1 days work = 4 × 5 = 20 units

∴ Total work = 48 + 20 = 68 units
This work is done by A & B
So, A & B will complete this

work in = $\frac{68}{9} = 7\frac{5}{9}$ days

120.(d) 40 (Total work)



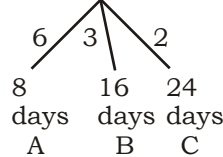
C's 2 days work = 2 × 4 = 8 units

B's 1 days work = 1 × 5 = 5 units
∴ Remaining work = 40 - 8 + 5
= 37 units

This remaining work is done

by A & B in = $\frac{37}{13} = 2\frac{11}{13}$ days

121. (a) 48 (Total work)



C's 2 days work = 2 × 2 = 4 units

D's one day work = 1 × 3 = 3 units

Remaining work = 48 - 4 + 3
= 47 units

Total time to finish the work

= $\frac{47}{9} = 5\frac{2}{9}$ days

122. (c) A + B → 12 days
B + C → 15 days
C + A → 20 days
60 (Total work)

A + B + B + C + C + A = 2 (A + B + C)
= 12

Eff. of A + B + C = 6 units

Then time taken by A + B + C to Complete the work

= $\frac{60}{6} = 10$ days.

123. (c) A + B → 72
B + C → 120
A + C → 90
360 (Total work)

2 (A + B + C) = 5 + 3 + 4

Eff. of A + B + C = $\frac{12}{2} = 6$ units

Then time taken by (A + B + C) to

complete the work = $\frac{360}{6}$

= 60 days.

124. (a) 10 Men → 12 days
10 women → 6 days
12 (Total work)

Efficiency of 10 men and 10 women = 2 + 1 = 3 units

Time taken by all working to-

gether = $\frac{12}{3} = 4$ days.

125. (d) A + B → 12 days
B + C → 8 days
A + C → 6 days
24 (Total work)

∴ 2 (A + B + C) = 9

Eff. of A + B + C = 4.5 units

Eff of B = A + B + C - (A + C)

= 4.5 - 4 = .5 unit

Then B will complete the whole

work Alone = $\frac{24}{.5} = 48$ days.

126. (a) A + B → 8 days
B + C → 12 days
A + B + C → 6 days
24 (Total work)

Eff of A = (A + B + C) - (B + C)

= 4 - 2 = 2 units

Time taken by C & A together to complete the whole work

= $\frac{24}{2+1} = 8$ days.

127. (b) A + B → $\frac{9}{2}$ hrs
B + C → 3 hrs
A + C → $\frac{9}{4}$ hrs
9 (Total work)

∴ 2 (A + B + C) = 9

∴ Efficiency of A + B + C = $\frac{9}{2}$

units

Hence,

A + B + C will finish the work

$\frac{9}{\frac{9}{2}} = 2$ hours.

128. (b) A + B + C → 30 min
A + B → 50 min
150 (Total work)

Eff. of C = (A + B + C) - (A + B)

= 5 - 3 = 2 units

Time taken by C alone to complete the work

= $\frac{150}{2} = 75$ minutes.

129. (a) A → 12 days
B → 15 days
60 (Total work)

Work done by A + B in 5 days together = (5 + 4) × 5 = 45 units.

Remaining work

= 60 - 45 = 15 Units

Then time taken by A to complete the remaining work =

$\frac{15}{5} = 3$ days.

130. (d) $A \rightarrow m \text{ days.} \begin{matrix} n \\ mn \\ (Total \text{ work}) \end{matrix}$
 $A \rightarrow n \text{ days.} \begin{matrix} m \\ mn \\ (Total \text{ work}) \end{matrix}$
 Time taken by A and B to complete the work = $\frac{mn}{m+n}$ days

131. (b) $A : B + C = 3_{\times 5} : 1_{\times 5} = 4_{\times 5}$
 $B : A + C = 4_{\times 4} : 1_{\times 4} = 5_{\times 4}$
 $A : B + C = 15 : 5 = 20$
 $B : A + C = 16 : 4 = 20$
 then, efficiency of A = 5 units,
 B = 4 units and C = 20 - (5 + 4) = 11 units
 A, B and C complete the work in 24 days
 Hence, work done by A
 $= \frac{24 \times 20}{5} = 96 \text{ days.}$

132. (d) By $\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$
 $\frac{15M \times 7}{\frac{1}{3}} = \frac{5 \times x}{1} \Rightarrow x = 63 \text{ men}$

133. (a) $\therefore x$ can copy 80 pages in 20 hrs.

$$\therefore 1 \text{ hr. work of } x = \frac{80}{20} = 4 \text{ pages}$$

- $\therefore x + y$ can copy 135 pages in 27 hrs.

$$1 \text{ hrs work of } x + y = 5 \text{ pages.}$$

$$x \rightarrow 4 \text{ pages} \begin{matrix} 5 \\ 20 \end{matrix}$$

$$x + y \rightarrow 5 \text{ pages} \begin{matrix} 4 \\ 20 \end{matrix} \text{ (Total work)}$$

$$\text{Efficiency of } y = 5 - 4 = 1 \text{ unit/hr}$$

$$\text{time taken by } Y = \frac{20}{1} = 20 \text{ hour}$$

134. (d) $A \rightarrow 12 \text{ days} \begin{matrix} 3 \\ 36 \end{matrix}$
 $B \rightarrow 18 \text{ days.} \begin{matrix} 2 \\ 36 \end{matrix}$ (total work)

$$(A+B) \text{ work together for 2 days} \\ = (3 + 2) \times 2 = 10 \text{ units}$$

$$\text{Remaining work} = 36 - 10 \\ = 26 \text{ units.}$$

$$\text{time taken by B to finish the}$$

$$\text{remaining work} = \frac{26}{2} = 13 \text{ days.}$$

135. (c) 8 man can do a work in 12 days
 Then, Remaining work
 $= 8m \times (12 - 6) \text{ days}$
 Now,
 $8m \times 6 = (8 + 4) M \times x$
 $x = 4 \text{ days.}$

136. (c) $A \rightarrow 15 \text{ days} \begin{matrix} 2 \\ 30 \end{matrix}$
 $B \rightarrow 10 \text{ days.} \begin{matrix} 3 \\ 30 \end{matrix}$ (total work)
 work done by (A + B) in 2 days
 $= (3 + 2) \times 2 = 10 \text{ units.}$
 Remaining work = 30 - 10
 $= 20 \text{ units}$

- A Alone complete the Remaining work = $\frac{20}{2} = 10 \text{ days}$
 Hence the work complete in 10+2 = 12 days.

137. (a) work done by man and boy

$$\text{in 20 days} = \frac{20}{24} = \frac{5}{6}$$

$$\text{Remaining work} = 1 - \frac{5}{6} = \frac{1}{6}$$

- $\therefore$ Man complete $\frac{1}{6}$ work in 6 days.

- $\therefore$ Time taken by man to complete the whole work = 6×6 = 36 days

$$\text{Man} \rightarrow 36 \text{ days} \begin{matrix} 2 \\ 72 \end{matrix}$$

$$\text{Man+Boy} \rightarrow 24 \text{ days} \begin{matrix} 3 \\ 72 \end{matrix}$$

$$\text{Efficiency of Boy} = 3 - 2 = 1 \text{ unit}$$

$$\text{Boy will complete the work in} \\ = \frac{72}{1} = 72 \text{ days.}$$

138. (a) $A \rightarrow 12 \text{ days} \begin{matrix} 3 \\ 36 \end{matrix}$
 $B \rightarrow 18 \text{ days} \begin{matrix} 2 \\ 36 \end{matrix}$ (total work)

$$2 \text{ days work A and B} = 3+2 = 5 \text{ units}$$

$$\downarrow \times 7 \quad \downarrow \times 7$$

$$14 \text{ days} \quad 35 \text{ units}$$

$$\text{Remaining work} = 36 - 35 = 1 \text{ unit}$$

$$\text{time taken by A to complete the}$$

$$\text{remaining work} = \frac{1}{3} \text{ days.}$$

$$\text{Total time taken} = 14 + \frac{1}{3}$$

$$= 14 \frac{1}{3} \text{ days.}$$

139. (c) $A \rightarrow 10 \begin{matrix} 6 \\ 60 \end{matrix}$
 $B \rightarrow 12 \begin{matrix} 5 \\ 60 \end{matrix}$
 $C \rightarrow 15 \begin{matrix} 4 \\ 60 \end{matrix}$

$$\text{A's 5 day work} = 6 \times 5 = 30 \text{ units}$$

$$\text{B's 3 days work} = 5 \times 3 = 15 \text{ units}$$

Let we assume that all complete the work together

$$\text{Then total work} = 60 + 30 + 15 \\ = 105 \text{ unit.}$$

$$A + B + C = \frac{105}{15} = 7 \text{ days.}$$

140. (a) $A \rightarrow 30 \begin{matrix} 2 \\ 60 \end{matrix}$
 $B \rightarrow 20 \begin{matrix} 3 \\ 60 \end{matrix}$
 $C \rightarrow 10 \begin{matrix} 6 \\ 60 \end{matrix}$ (total work)

$$\text{First day (A + B)} = 3 + 2 = 5 \text{ units.}$$

$$\text{second day (A + C)} = 2 + 6 = 8 \text{ unit.}$$

$$2 \text{ days work} = 8 + 5 = 13 \text{ units}$$

$$\downarrow \times 4 \quad \downarrow \times 4$$

$$8 \text{ days} \quad 52 \text{ units}$$

$$\text{Remaining work} \\ = 60 - 52 = 8 \text{ units}$$

$$9 \text{ th day work of A + B} = 5 \text{ units}$$

$$\text{Remaining work is done by}$$

$$B + C \text{ in } = \frac{3}{8} \text{ days}$$

$$\text{total time taken}$$

$$= 8 + 1 + \frac{3}{8} = 9 \frac{3}{8} \text{ days}$$

141. (b) work done by A in 6 days

$$= \frac{6}{8} = \frac{3}{4} \text{ unit}$$

$$\text{work destroy by B in 2 days}$$

$$= \frac{2}{3} \text{ unit}$$

$$\text{Remaining work}$$

$$= \frac{3}{4} - \frac{2}{3} = \frac{1}{12} \text{ unit}$$

$$\text{Now, time taken by A in doing}$$

$$\frac{11}{12} \text{ unit} = \frac{11}{12} \times 8 = \frac{22}{3} = 7 \frac{1}{3} \text{ days.}$$

142. (c) A + B can complete the work in 3 days.

work done by A+B in 2 days

$$= \frac{2}{3} \text{ unit}$$

Then, time taken by A to complete the remaining work

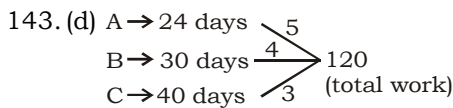
$$= \frac{2}{1 - \frac{2}{3}} = 6 \text{ days}$$



Efficiency of B = 2 - 1 = 1 unit

Time taken by B to complete the

$$\text{work} = \frac{6}{1} = 6 \text{ days.}$$



then,

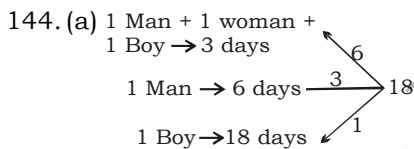
We assume that C do the work till the work be finished

C's 4 days work = 3 × 4 = 12 units

Total work = 120 + 12 = 132 units

Time taken by A + B + C to

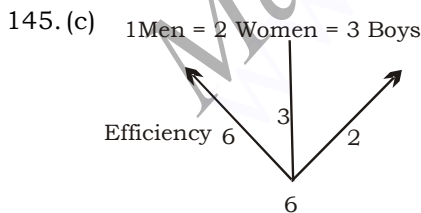
$$\text{finish the work} = \frac{132}{12} = 11 \text{ days}$$



Efficiency of woman = 6 - (3 + 1) = 2 units

Time taken by a woman to

$$\text{complete the work} = \frac{18}{2} = 9 \text{ days}$$



According to the question,

$$1 \text{ man} \times 88 = (1M + 1W + 1B) \times x$$

$$\Rightarrow 6 \times 88 = (6 + 3 + 2) x$$

$$x = 48 \text{ days.}$$

146. (d) A do $\frac{1}{2}$ Piece of work in 5 days

∴ Time taken by A to completes the work = 5 × 2 = 10 days

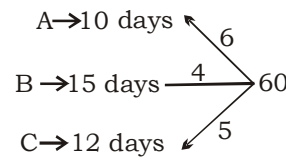
B can do $\frac{3}{5}$ th work in 9 days

∴ Time taken by B to complete

$$\text{the work} = 9 \times \frac{5}{3} = 15 \text{ days.}$$

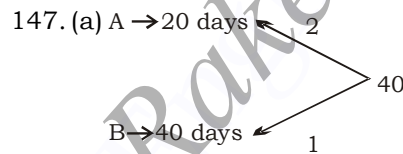
C can do $\frac{2}{3}$ work in 8 days

∴ Time taken by C to complete the work = 12 days



Time taken by (A+B+C) together to complete the work =

$$\frac{60}{15} = 4 \text{ days}$$



Work done by (A+B) together in 5 days = (2 + 1)5 = 15 units

Remaining work = 40 - 15

= 25 units

Fraction of Remaining work

$$= \frac{25}{40} = \frac{5}{8}$$

148. (a) By $\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$

$$\frac{\frac{A}{1}}{2} = \frac{\frac{B}{3}}{4}$$

$$\frac{\frac{A}{B}}{1} = \frac{\frac{2}{3}}{3}$$

A + B = 18 (Given)

then total work = 5 × 18 = 90

then work done alone by B

$$= \frac{5 \times 18}{3} = 30 \text{ days.}$$

149. (a) Let x be the no of additional workers to be employed

$$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$$

$$\therefore \frac{200 \text{ Men} \times 50 \text{ days}}{\frac{1}{4} \text{ work}}$$

$$= \frac{(200 + x) \text{ Men} \times 100}{\frac{3}{4}}$$

$$200 + x = 300$$

$$x = 100$$

150. (c) Janardan completes $\frac{2}{3}$ work

in 10 days

∴ Time taken by Janardan to complete total work

$$= 10 \times \frac{3}{2} = 15 \text{ days}$$

Hence, time taken by Janardan to complete the $\frac{3}{5}$

work

$$= 15 \times \frac{3}{5} = 9 \text{ days.}$$

151. (c) Babu + Ashu → 7 days.

$$A = B \times \frac{7}{4}$$

$$\frac{A}{B} = \frac{7}{4}$$

then,

Total efficiency → 11 Units

work done by Ashu alone

$$= \frac{11 \times 7}{7} = 11 \text{ days.}$$

152. (c)	A	B
Eff →	100	140
	5	7
Time →	7	5
	10 × ↓	↓ × 10
	70	50 days

153. (b) Efficiency of A : B

$$= 1 : 2 = 2 : 4$$

∴ C work half as work done by A + B

∴ Efficiency of C : A + B

$$= 1 : 2 = 3 : 6$$

Therefore, Efficiency of A = 2, B

$$= 4, C = 3$$

Total Work = $20 \times 3 = 60$ Units

And Total Efficiency = $2 + 4 + 3 = 9$ Units

Hence, Work done by A, B and

$$C \text{ together} = \frac{60}{9} = 6\frac{2}{3} \text{ days.}$$

154. (b)

	A :	B
Eff.	3 :	1
Time	1 :	3

$$(3 - 1) = 2 \text{ unit} = 60 \text{ days}$$

$$1 \rightarrow 30 \text{ Units.}$$

$$\text{Time taken by A} = 1 \times 30 = 30 \text{ Days}$$

$$\text{Time taken by B} = 3 \times 30 = 90$$

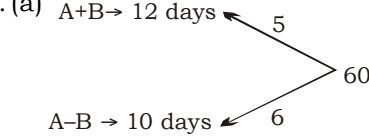
Days



A & B work together

$$= \frac{90}{4} = 22\frac{1}{2} \text{ days.}$$

155. (a) A+B → 12 days



$$A - B = 6$$

$$A + B = 5$$

$$2B = 1$$

$$B = \frac{1}{2}$$

$$B \text{ complete the work} = \frac{60}{2}$$

$$= 30 \text{ days}$$

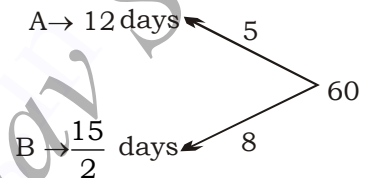
156. (a) Time taken by B

$$= 12 \times \frac{100}{160} = \frac{15}{2} \text{ days.}$$

157. (d) A do a certain work in

$$\rightarrow 12 \text{ days.}$$

$$B \text{ can do} \rightarrow 12 \times \frac{100}{160} = \frac{15}{2} \text{ days}$$



A + B can together do in

$$= \frac{60}{13} \text{ days}$$



10

WORK AND WAGES

Work:- Activity involving mental or physical effort done in order to achieve a result.

Wage:- A payment usually of money for labour or services usually according to contract

and on hourly, daily or piecework basis.

Examples

1. If 20 persons can do a piece of work in 7 days then calculate the number of persons required to complete the work in 28 days.

Sol. Since work is constant, therefore
 $M_1 \times D_1 = M_2 \times D_2 = \text{work done.}$
 $20 \times 7 = M_2 \times 28$
 $M_2 = 5$

2. If 25 men can do a piece of work in 36 days working 10 hours a day, then how many men are required to complete the work working 6 hours a day in 20 days?

Sol. $M_1 \times D_1 \times H_1 = M_2 \times D_2 \times H_2$
 $25 \times 36 \times 10 = M_2 \times 20 \times 6$
 $M_2 = 75 \text{ persons}$

3. If 24 men can do a piece of work in 40 days working 12 hours a day, then how many men are required to complete the double work working 6 hours a day in 20 days?

Sol. $\frac{M_1 \times D_1 \times H_1}{W_1} = \frac{M_2 \times D_2 \times H_2}{W_2}$
 $\frac{24 \times 40 \times 12}{1} = \frac{M_2 \times 20 \times 6}{2}$

$$M_2 = 192$$

4. A contractor employed 30 men to complete the project in 100 days. But later on he realised that after 25 days only 20% of work had been completed.

(a) How many extra days, than the scheduled time are required?

- (b) To complete the work on the scheduled time how many men he has to increase?

- (c) If the amount of work is also increased by 20% of the actual work then how many extra days are required (in comparison with scheduled time) but the number of men remained constant?

- (d) How many men should be increased so that the work will be completed in 25 days less than the scheduled time?

Sol. (a) 20% work complete in
 = 25 days
 • 100% work complete in
 $\frac{25}{20} \times 100 = 125 \text{ days}$

Extra days = $125 - 100 = 25 \text{ days}$

- (b) Let x number of men are more required

$$\begin{aligned} \therefore M_1 \times D_1 &= M_2 \times D_2 \\ 30 \times 100 &= (x + 30) \times 75 \\ 120 &= 3x + 90 \\ 3x &= 30 \\ x &= 10 \text{ days} \end{aligned}$$

- (c) $20\% = \frac{1}{5}$

Original work = 5

New work = 6

$$\frac{M_1 \times D_1}{W_1} = \frac{M_2 \times D_2}{W_2}$$

$$\frac{30 \times 125}{5} = \frac{30 \times D_2}{6}$$

$$D_2 = 150 \text{ days}$$

$$\text{Extra days} = 150 - 100 = 50 \text{ days}$$

$$(d) \text{ Original time} = 100 \text{ days}$$

$$\text{New time} = 100 - 25 = 75 \text{ days}$$

$$M_1 \times D_1 = M_2 \times D_2$$

$$30 \times 125 = M_2 \times 75$$

$$M_2 = 50 \text{ men.}$$

$$\text{Extra men} = 50 - 30 = 20 \text{ men}$$

5. 4 men and 6 women can complete a work in 8 days while 3 men and 7 women can complete it in 10 days. In how many days will 10 women complete it?

Sol. 4 men + 6 women = 8 days.
 3 men + 7 women = 10 days
 $\therefore 32 \text{ men} + 48 \text{ women} = 1 \text{ day} \quad \dots\dots(i)$
 $30 \text{ men} + 70 \text{ women} = 1 \text{ day} \quad \dots\dots(ii)$
 compare equation (i) and (ii)
 $32 \text{ men} + 48 \text{ women} = 30 \text{ men} + 70 \text{ women}$
 $2 \text{ men} = 22 \text{ women}$

$$\boxed{1 \text{ men} = 11 \text{ women}}$$

$$4 \text{ men} = 44 \text{ women}$$

$$B_1 \times D_1 = B_2 \times D_2$$

$$(4 \text{ m} + 6 \text{ w}) \times 8 = 10 \text{ w} \times D_2$$

$$(44 \text{ w} + 6 \text{ w}) \times 8 = 10 \text{ w} \times D_2$$

$$D_2 = \frac{50 \times 8}{10}$$

$$D_2 = 40 \text{ days}$$

6. A and B can complete a piece of work in 15 days and 10 days respectively. They contracted



to complete the work for Rs. 30,000. The share of A in the contracted money is ?

Sol. A → 15 — 2
B → 10 — 3 — 30(T.W)

A's 1 day work = 2 units
B's 1 day work = 3 units
(A+B)'s 1 day work = (2+3)
= 5 units

Time taken by (A+B) to complete the whole work

$$= \frac{30}{5} = 6 \text{ day}$$

Note:- Wage is distributed in the ratio of efficiency if the work is done for same time.

A's efficiency = 2
B's efficiency = 3
5 units = ₹ 30,000
2 units (A's share)

$$= \frac{30,000}{5} \times 2 = ₹ 12000$$

7. A builder decided to build a farmhouse in 60 days. He employed 150 men in the beginning and 130 more after 45 days and completed the construction in stipulated time. If he had not employed the additional men, how many days behind schedule would it have been finished?

- (a) 10 days (b) 23 days
(c) 13 days (d) 15 days

Sol. (c) Let the number of days = x
According to question
 $150 \times x = 150 \times 45 + (150 + 130) \times 15$
 $150x = 6750 + 280 \times 15$

$$x = \frac{10950}{150} = 73 \text{ days}$$

Extra days = 73 - 60 = 13 days

8. There is a sufficient food for 150 men for 15 days. After 10 days, 75 men leave the place. For how many days will the rest of the food last for the rest of the men?

- (a) 10 days (b) 8 days
(c) 5 days (d) 15 days

Sol. (a) Let the number of days food for the rest men = x days

A.T.Q $150 \times 5 = 75 \times x$
 $x = 10 \text{ days}$

9. Wages for 45 women amount to Rs.15525 in 48 days. How many men must work 16 days to receive Rs.5750, the daily wages of a man being double than that of a woman?

- (a) 25 men (b) 24 men
(c) 18 men (d) 10 men

Sol. (a) wage of 1 woman in 1 day

$$= \frac{15525}{48 \times 45} = \text{Rs. } \frac{115}{16}$$

wage of x men in 1 day

$$= \text{Rs. } \frac{5750}{16} = \text{Rs. } \frac{2875}{8}$$

A.T.Q. $\frac{2875}{8 \times x} = \frac{115}{16} \times 2$

$$x = \frac{2875 \times 16}{115 \times 8 \times 2}$$

$$x = 25 \text{ men}$$

10. 60 men could complete a work in 250 days. They worked together for 200 days After that the work had to be stopped for 10 days due to bad weather. How many more men should be engaged to complete the work in time?

- (a) 10 (b) 15
(c) 18 (d) 20

Sol. (b) Work done by 60 men in

$$200 \text{ days} = \frac{200}{250} = \frac{4}{5}$$

$$\text{Remaining work} = 1 - \frac{4}{5} = \frac{1}{5}$$

$$60 \times 50 = 40 \times x$$

$$x = \frac{50 \times 60}{40} = 75$$

$$\text{Extra more} = 75 - 60 = 15$$

11. If 6 persons working 8 hours a day earn ₹ 8400 per week, then 9 persons working 6 hours a day will earn per week?

- (a) ₹ 8400 (b) ₹ 16800
(c) ₹ 9450 (d) ₹ 16200

Sol. (c) $\frac{6 \text{ persons} \times 8 \text{ hr}}{8400} = \frac{9 \text{ Persons} \times 6 \text{ hr}}{\text{Amount}}$

Amount earned by 9 persons = ₹ 9450

12. A contractor undertook to complete a project in 90 days and employed 60 men on it.

After 60 days, he found that $\frac{3}{4}$

of the work has already been completed. How many men can he discharge so that the project may be completed exactly on time?

- (a) 40 (b) 20
(c) 30 (d) 15

Sol. (b) Let 'n' number of men can be discharged.

According to the question

$$\frac{60 \text{ men} \times 60 \text{ days}}{\frac{3}{4} \text{ work}}$$

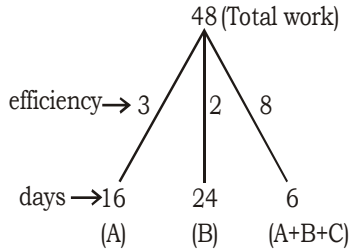
$$= \frac{(60 - n) \text{ men} \times 30 \text{ days}}{\frac{1}{4} \text{ work}}$$

$$n = 20$$

therefore, number of men discharged = 20

13. A can do a piece of work in 16 days and B in 24 days. They take the help of C and they all together finish the work in 6 days. If the total remuneration for the work is ₹ 400. The amount (in rupees) each will receive, in proportion, to do the work is

- (a) A : 150, B : 100, C : 150
(b) A : 100, B : 150, C : 150
(c) A : 150, B : 150, C : 100
(d) A : 100, B : 150, C : 100

**Sol.** (a)

C's efficiency = $8 - 3 - 2 = 3$ units

A	:	B	:	C	:	Total
3	:	2	:	3	:	8
↓×50		↓×50		↓×50		↓×50
₹ 150		₹ 100		₹ 150		₹ 400

14. If 10 men or 20 boys can make 260 mats in 20 days, then how many mats will be made by 8 men and 4 boys in 20 days?

- (a) 260 (b) 240
(c) 280 (d) 520

Sol. (a) We know,

$$\left[\frac{m_1 \times t_1 \times d_1}{w_1} = \frac{m_2 \times t_2 \times d_2}{w_2} \right]$$

According to the question,

$$\frac{10M \times 20\text{days}}{260\text{Mats}} = \frac{20B \times 20\text{days}}{260\text{Mats}}$$

$$10M = 20B$$

$$1M = 2B$$

$$\frac{M}{B} = \frac{2}{1}$$

$$1M \text{ work} = 2 \text{ units/day}$$

$$1B \text{ work} = 1 \text{ unit/day}$$

Mats made by $(8M + 4B)$ in 20 days

$$\frac{10M \times 20\text{days}}{260\text{Mats}} = \frac{(8M + 4B) \times 20\text{days}}{x \text{ mats}}$$

$$\frac{10 \times 2 \times 20\text{days}}{260m}$$

$$= \frac{20 \times 20\text{days}}{xm}$$

after solving,

$$x = 260 \text{ mats}$$

15. A 10 hectare field is reaped by 2 men, 3 women and 4 children together in 10 days. If working capabilities of a man, a woman and a child are in the ratio 5 : 4 : 2, then a 16 hectare field will be reaped by 6 men, 4 women and 7 children in

- (a) 5 days (b) 6 days
(c) 7 days (d) 8 days

Sol. (d) According to the question, efficiency of a man, a woman and a child are 5 : 4 : 2 units days

One day work of 2 men

$$= 2 \times 5 = 10 \text{ units}$$

One day work of 3 women

$$= 3 \times 4 = 12 \text{ units}$$

One day work of 4 children

$$= 4 \times 2 = 8 \text{ units}$$

Applying formula,

let time taken be 'D' days

$$\frac{(10 + 12 + 8) \times 10_{\text{days}}}{10 \text{ hectare}}$$

$$= \left[\frac{[(6_{\text{men}} \times 5) + (4_{\text{women}} \times 4) + (7_{\text{children}} \times 2)] \times D}{16_{\text{hectare}}} \right]$$

$$\frac{(30) \times 10}{10} = \frac{[60] \times D}{16}$$

$$D = 8 \text{ days}$$

16. A road of 5 km length will be constructed in 100 days. So 280 workers were employed. But after 80 days it was found that only $3\frac{1}{2}$ km road was com-

pleted. Now how many more people were need to finish the work in the specified time?

- (a) 480 (b) 80
(c) 200 (d) 100

Sol. (c) Let 'n' more number of men are required to complete the job in 20 days.

$$\frac{80_{\text{days}} \times 280_{\text{worker}}}{3.5\text{km}} = \frac{(280 + n)_{\text{worker}} \times 20_{\text{days}}}{1.5\text{km}}$$

After solving :

$$480 = 280 + n$$

$$n = 200$$

17. A contractor was engaged to construct a road in 16 days. After working for 12 days with 20 labours it was found that only

$\frac{5}{8}$ th of the road had been constructed. To complete the work in stipulated time the number of extra labours required are.

- (a) 16 (b) 12
(c) 10 (d) 18

Sol. (a) From $\frac{m_1 \times d_1 \times t_1}{w_1} = \frac{m_2 \times d_2 \times t_2}{w_2}$

Let number of extra workers be x

$$\Rightarrow \frac{20 \times 12}{\frac{5}{8}} = \frac{(20 + x) \times 4}{\frac{3}{8}}$$

$$\Rightarrow 4 \times 12 = \frac{(20 + x) \times 4}{3}$$

$$\Rightarrow 36$$

$$= 20 + x$$

$$\Rightarrow x = 16$$

Therefore, Number of extra workers = 16



EXERCISE

1. If 2 men or 3 women or 4 boys can do a piece of work in 52 days, then the same piece of work will be done by 1 man, 1 woman and 1 boy in :
 (a) 48 days
 (b) 36 days
 (c) 45 days
 (d) None of these
2. 2 men or 5 women or 7 boys can finish a work in 469 days, then the number of days taken by 7 men, 5 women and 2 boys to finish the work in :
 (a) 134
 (b) 106
 (c) 100
 (d) 98
3. 6 children and 2 men complete a certain piece of work in 6 days. Each child takes twice the time taken by a man to finish the work. In how many days will 5 men finish the same work?
 (a) 6
 (b) 8
 (c) 9
 (d) 15
4. 450 man-days of work can be completed by certain number of men in some days. If the number of people (men) are increased by 27, then the number of days required to complete the same work is decreased by 15. The number of days required to complete the three times work (than the previous/actual work) by 27 men?
 (a) 50 days
 (b) 60 days
 (c) 54 days
 (d) 45 days
5. 33 men can do a job in 30 days. If 44 men started the job together and after every day of the work, one person leaves. What is the minimum number of days required to complete the whole work?
 (a) 21
 (b) 42
 (c) 45
 (d) 44
6. 7 Indian and 4 Chinese finished a job in 5 days. 7 Japanese and 3 Chinese finish the same job in 7 days. Given that the efficiency of each person of a particular nationality is same but different from others. One Indian, one Chinese and one Japanese will complete the work in :
 (a) $18\frac{3}{13}$ days
 (b) $20\frac{5}{12}$ days
 (c) $21\frac{6}{14}$ days
 (d) $20\frac{7}{12}$ days
7. 4 men and 2 boys can finish a piece of work in 5 days, 3 women and 4 boys can finish the same work in 5 days. Also 2 men and 3 women can finish the same work in 5 days. In how many days 1 man, 1 woman and one boy can finish the work, at their double efficiency?
 (a) $4\frac{8}{13}$
 (b) $4\frac{7}{13}$
 (c) $3\frac{7}{13}$
 (d) 5
- Direction:-** At Rakesh Yadav Publication every book goes through 3 phases (or stages) typing, composing and binding. There are 16 typists, 10 composer and 15 binders. A typist can type 8 books in each hour, a composer can compose 12 books in each hour and a binder can bind 12 books in each hour. All of the people at Rakesh Yadav Publication works for 10 hours a day and each person is trained to do only the job of 1 category.
8. How many books can be prepared in one day?
 (a) 1500
 (b) 1200
 (c) 1440
 (d) 1380
- Direction:-** 8 men and 5 women working 6 hours a day can complete a work in 4 days. Also 4 men and 5 women working for 8 hours a day can complete the same job in 5 days. Similarly 5 boys working 8 hours a day can complete the same job in 30 days.
9. If 4 men, 3 women and 4 boys worked together everyday for 5 hours, then in how many days they have completed the work?
 (a) 3
 (b) 4
 (c) 8
 (d) 6
10. Three men and 5 women together can finish a job in 3 days. Working on the same job 3 women take 5 days more than the time required by 2 men. What is the ratio of efficiency of a man to a woman?
 (a) 2 : 1
 (b) 3 : 2
 (c) 5 : 2
 (d) 4 : 1
11. The ratio of the work of a man, a woman and a boy is 4 : 3 : 2 and in a factory 16 men, 18 women and 24 boys do the work and they earn 13944 Rs. in a week. Then find the annual earning of 36 men, 24 women and 20 boys, if a year contains 365 days?
 (a) 1121280 Rs.
 (b) 1121240 Rs.
 (c) 1122280 Rs.
 (d) None of these
12. 3 men, 8 women and 18 boys can do a work in 1 day, $\frac{3}{4}$ days and $\frac{1}{2}$ day respectively. If 3 women and 3 boys are hired for 1 day work then find out how many men are hired for how many days to complete the remaining work?
 (a) 1 Man for $\frac{1}{2}$ day
 (b) 1 Man for 2 days
 (c) 2 Men for 1 day
 (d) None of these
13. 8 men and 12 boys can do a work in 12 days, while 16 men in 8 hours do the same work as 12 boys do in 24 hours. Then find in how many days will 40 men and 45 boys do thrice the work?
 (a) 8 days
 (b) 6 days
 (c) 16 days
 (d) None of these



14. A contractor employs 200 men who finish $\frac{5}{6}$ of total work in 10 days. Due to rain the work will stop for 20 days, and $\frac{2}{5}$ th work also destroyed. After rain only 150 men came on the work. In how many days the work will complete?
- (a) 38 days
(b) 8 days
(c) 28 days
(d) None of these
15. There is an arrangement of food for 1600 soldiers for 80 days and each soldier take 900 gm food. After 30 days 400 soldiers left the camp. Now each soldier take 1000 gm food everyday. The remaining arrangement last for how many days?
- (a) 60 days
(b) 50 days
(c) 40 days
(d) None of these
16. There is an arrangement of food for certain number of soldiers for certain number of days. After 20 days, $\frac{1}{4}$ th soldiers left the camp. Now the remaining arrangement will last long for same number of days that are in starting find the number of certain days?
- (a) 70 days (b) 140 days
(c) 35 days (d) 80 days
17. 20 men can do a piece of work in 18 days. They worked together for 3 days, then 5 men joined them. In how many more days is the work completed?
- (a) 12 (b) 13
(c) 14 (d) 15
18. 10 men or 15 women or 20 boys complete a piece of work in 60 days by working 6 hours a day. Then find how many hours required in a day for 10 men, 15 women and 20 boys to finish the work in 15 days ?
- (a) 8 hours
(b) 10 hours
(c) 16 hours
(d) None of These
19. 25 men can do a piece of work in 10 days while 20 children can do the same work in 50 days. If 5 men started the work after 10 days how many children must assist so that the remaining work is completed in 20 days?
- (a) 60 (b) 40
(c) 25 (d) 20
20. The wages of 6 men, 8 women & 4 boys is 520 rupees. The wages of 5 men is equal to that of 8 women and the wages of 5 boys is equal to that of 4 women. Find the total wages of 7 men, 6 women and 10 boys.
- (a) Rs 610 (b) Rs. 630
(c) Rs 665 (d) Rs. 700
21. 6 men and 5 children can earn Rs. 1400 in 5 days. 8 men and 7 children can earn Rs. 3040 in 8 days. How many days will it take to 4 men and 3 children to earn Rs. 720?
- (a) 3 days (b) 2 days
(c) 4 days (d) None of these
22. 9 men and 20 women working $\frac{5}{4}$ hours a day can do $\frac{3}{4}$ of work in 9 days and the remaining part of the work is done by 7 men and 46 women, working $\frac{1}{4}$ hours a day, in 5 days. Find the number of the days for 13 men and 14 women to complete the same entire work by working $\frac{1}{2}$ hour a day.
- (a) 10 days (b) 15 days
(c) 16 days (d) 21 days
23. 3 men and 5 women can built a wall of length 25 metre in 20 days. 2 men and 6 women built 40 metres wall of same type in 40 days. Find the ratio of work efficiencies of 1 men and 1 women.
- (a) 2 : 3 (b) 4 : 1
(c) 5 : 1 (d) 1 : 5
24. 3 men or 4 women or 5 boys can earn Rs. 150 daily. Then, 7 men with 12 women and 3 boys will earn per day is :
- (a) Rs. 880 (b) Rs. 950
(c) Rs. 900 (d) Rs. 910
25. 3 men and 4 boys can earn Rs.756 in 7 days. 11 men and 13 boys can earn Rs.3008 in 8 days. In what time will 7 men with 9 boys earn Rs.2480?
- (a) 12 days (b) 15 days
(c) 10 days (d) 18 days
26. 20 men can cut 30 trees in 4 hours. If 4 men leave the job, how many trees will be cut in 6 hours?
- (a) 30 trees (b) 36 trees
(c) 40 trees (d) None of these
27. 5 men can prepare 10 toys in 6 days working 6 hours a day. Then in how many days can 12 men prepare 16 toys working 8 hrs a day?
- (a) 3 days (b) 4 days
(c) 6 days (d) 5 days
28. 10 men can prepare 20 toys in 3 days working 12 hours a day. Then in how many days can 24 men prepare 32 toys working 4 hrs a day?
- (a) 2 days (b) 3 days
(c) 4 days (d) 6 days
29. 20 men can prepare 40 toys in 24 days working 18 hours a day. Then in how many days can 36 men prepare 48 toys working 16 hrs a day?
- (a) 16 days (b) 12 days
(c) 21 days (d) 18 days
30. 10 men can complete a piece of work in 15 days and 15 women can complete the same work in 12 days. If all the 10 men and 15 women work together, in how many days will work get completed?



- (a) 6 (b) $7\frac{2}{3}$
(c) $6\frac{2}{3}$ (d) $6\frac{1}{3}$
31. Five men can do a piece of work in 2 hours, which 7 women could do in 3 hours, or 9 children in 4 hours. How long would 1 man, 1 woman and 1 child together take to do the work?
(a) $\frac{1260}{221}$ (b) $\frac{1270}{231}$
(c) $\frac{1221}{260}$ (d) None of these
32. If 12 men and 16 boys can do a piece of work in 5 days and 13 men and 24 boys can do it in 4 days, how long will 7 men and 10 boys take to do it?
(a) $8\frac{1}{3}$ days (b) $12\frac{1}{8}$
(c) $12\frac{1}{3}$ (d) None of these
33. If 12 men and 16 boys can do a piece of work in 5 days and 13 men and 24 boys can do it in 4 days, compare the daily work done by a man with that of a boy:
(a) 1 : 2 (b) 2 : 1
(c) 1 : 3 (d) 3 : 1
34. If 30 men and 14 boys can reap a field in 21 days, in how many days will 20 men and 4 boys reap it, supposing 3 men can do as much work as 5 boys?
(a) 36 days (b) 30 days
(c) 42 days (d) 45 days
35. If 5 men and 2 boys working together can do 4 times as much work per hour as a man and a boy together, compare the work of a man with that of a boy :
(a) 2 : 1 (b) 3 : 1
(c) 4 : 1 (d) Data inadequate
36. If Sandeep hires 2 men and 3 boys for 6 days to do the same piece of work as 11 men and 5 boys could do in $1\frac{1}{2}$ days compare the work of a boy with that of a man :
(a) 7 : 3 (b) 3 : 7
(c) 2 : 5 (d) 5 : 2
37. 8 children and 12 men complete a certain piece of work in 9 days. Each child takes twice the time by a man to finish the work. In how many days will 12 men finish the same work?
(a) 8 days (b) 9 days
(c) 12 days (d) 15 days
38. A certain number of men can do a work in 45 days. If there were 4 men less it could be finished in 15 days more. How many men are there?
(a) 28 men (b) 16 men
(c) 24 men (d) 20 men
39. A certain number of men can do a work in 30 days. If there were 6 men less it could be finished in 20 days more. How many men are there?
(a) 15 men (b) 12 men
(c) 18 men (d) 20 men
40. 6 men and 3 boys working together can do 2 times as much work per hour done by 2 men and 2 boys together. Compare the work of a man with that of a boy :
(a) 2 : 1 (b) 3 : 1
(c) 3 : 2 (d) 4 : 1
41. 1 man or 2 women or 3 boys can do a work in 44 days. Then in how many days will 1 man, 1 woman and 1 boy do the work?
(a) 24 days (b) 12 days
(c) 8 days (d) 16 days
42. 3 men or 4 women or 5 boys can do a work in 47 days. Then in how many days will 1 man, 1 woman and 1 boy do the work?
(a) 40 days (b) 50 days
(c) 60 days (d) 45 days
43. 1 man or 3 women or 4 boys can do a work in 38 days. Then in how many days will 1 man, 1 woman and 1 boy do the work?
(a) 24 days (b) 12 days
(c) 18 days (d) 36 days
44. 1 man or 2 women or 4 boys can do a work in 56 days. Then in how many days will 1 man, 1 woman and 1 boy do the work?
(a) 24 days (b) 28 days
(c) 20 days (d) 32 days
45. A group of men decided to do a work in 12 days, but 8 of them became absent. If the rest of the group did the work in 20 days, find the original number of men:
(a) 18 men (b) 20 men
(c) 22 men (d) 24 men
46. A group of men decided to do a work in 15 days, but 2 of them became absent. If the rest of the group did the work in 25 days, find the original number of men:
(a) 5 men (b) 4 men
(c) 7 men (d) 6 men
47. A certain number of men can do a work in 60 days. If there were 8 men more it could be finished in 10 days less. How many men are there?
(a) 40 men (b) 20 men
(c) 35 men (d) 25 men
48. A certain number of men can do a work in 50 days. If there were 3 men more it could be finished in 5 days less. How many men are there?
(a) 36 men (b) 18 men
(c) 27 men (d) 30 men
49. A builder decided to build a farm house in 40 days. He employed 100 men in the beginning and 100 more after 35 days and completed the construction in stipulated time. If he had not employed the additional men, how many days behind schedule would it have been finished?



- (a) 5 days (b) 8 days
(c) 10 days (d) 9 days
50. There is a sufficient food for 200 men for 36 days. After 33 days, 140 men leave the place. For how many days will the rest of the food last for the rest of the men?
(a) 3 days (b) 10 days
(c) 18 days (d) 15 days
51. A team of 30 men is supposed to do a work in 38 days. After 25 days, 5 more men were employed and the work finished one day earlier. How many days would it have been delayed if 5 more men were not employed?
(a) 1 day (b) 2 days
(c) 3 days (d) None of these
52. A team of 25 men is supposed to do a work in 44 days. After 18 days, 2 more men were employed and the work finished 1 day earlier. How many days would it have been delayed if 2 more men were not employed?
(a) 1 day (b) 2 days
(c) 1.5 days (d) None of these
53. 38 men, working 6 hours a day can do a piece of work in 12 days. Find the number of days in which 57 men working 8 hrs a day can do twice the work. Assume that 2 men of the first group do as much work in 1 hour as 3 men of the second group do in 1.5 hr.
(a) 27 days (b) 28 days
(c) 18 days (d) None of these
54. Twenty-four men can complete a work in sixteen days. Thirty-two women can complete the same work in twenty-four days. Sixteen men and sixteen women started working and worked for fourteen days. How many more men are to be added to complete the remaining work in 2 days?
(a) 48 (b) 24
(c) 36 (d) None of these
55. 25 men and 15 women can complete a piece of work in 12 days. All of them start working together and after working for 8 days the women stopped working. 25 men completed the remaining work in 6 days. How many days will it take for completing the entire job if only 15 women are put on the job?
(a) 60 days (b) 88 days
(c) 94 days (d) 36 days
56. 10 men and 15 women finish a work in 6 days. One man alone finishes that work in 100 days. In how many days will a woman finish the work?
(a) 125 days (b) 150 days
(c) 90 days (d) 225 days
57. 12 men take 18 days to complete a job whereas 12 Women in 18 days can complete the same job. How many days will 10 men and 8 women together take to complete $\frac{3}{4}$ of the same job?
(a) 6 days (b) 13.5 days
(c) 12 days (d) 9 days
58. If 5 men and 3 boys can reap 23 hectares in 4 days and if 3 men and 2 boys can reap 7 hectares in 2 days, how many boys must assist 7 men in order that they may reap 45 hectares in 6 days?
(a) 2 boys (b) 6 boys
(c) 4 boys (d) 5 boys
59. A can copy 75 pages in 25 hours, A and B together can copy 135 pages in 27 hours. In what time can B copy 42 pages?
(a) 21 hrs (b) 5 hrs 36 sees
(c) 18 hrs (d) 24 hrs
60. 12 men can complete a work within 9 days. After 3 days they started the work, 6 men joined them to replace 2 men. How many days will they take to complete the remaining work?
(a) 2 (b) 3
(c) 4 (d) 4.5
61. If factory A turns out x cars an hour and factory B turns out y cars every 2 hours, the number of cars which both factories turn out in 8 hours is.
(a) $8(x + y)$ (b) $8x + \frac{y}{2}$
(c) $16(x + y)$ (d) $4(2x + y)$
62. If factory A turns out x cars 9 hour and factory B turns out y cars every 4 hours, the number of cars which both factories turn out in 18 hours is -
(a) $8(x + y)$ (b) $2x + \frac{9y}{2}$
(c) $16(x + y)$ (d) $2(4x + y)$
63. Wages of 20 boys for 15 days is Rs.9000. If the daily wage of a man is one and half times that of a boy, how many men must work for 30 days to earn Rs.13500?
(a) 12 men (b) 20 men
(c) 16 men (d) 10 men
64. If 3 men with 4 boys can earn Rs.2100 in 7 days and 11 men with 13 boys can earn Rs.8300 in 8 days, in what time will 7 men with 9 boys earn Rs.11000?
(a) 16 days (b) 18 days
(c) 14 days (d) 20 days
65. A, B and C together earn Rs.1350 in 9 days. A and C together earn Rs.470 in 5 days. B and C together earn Rs. 760 in 10 days. Find the daily earning of C :
(a) Rs. 20 (b) Rs. 40
(c) Rs. 50 (d) None of these
66. 5 men and 5 women earn Rs. 660 in 3 days. 10 men and 20 women earn Rs. 3500 in 5 days. In how many days can 6 men and 4 women earn Rs.1060?
(a) 5 days (b) 10 days
(c) 6 days (d) 12 days
67. 4 men and 6 boys earn Rs.1600 in 5 days. 3 men and 7 boys earn Rs.1740 in 6 days, in what time 7 men and 6 boys earn Rs. 3760?
(a) 6 days (b) 8 days
(c) 10 days (d) 12 days



68. 39 persons can repair a road in 12 days working 5 hours a day. In how many days will 30 persons working 6 hours a day complete the work?
(a) 10 days (b) 13 days
(c) 14 days (d) 15 days
69. If 72 men can build a wall of 280 m length in 21 days. how many men could take 18 days to build a similar type of wall of length 100 m?
(a) 30 (b) 10
(c) 18 (d) 28
70. 4 mat-weavers can weave 4 mats in 4 days At the same rate how many mats would be woven by 8 mat-weavers in 8 days?
(a) 4 (b) 8
(c) 12 (d) 16
71. If the work done by $(x-1)$ men in $(x+1)$ days is to the work done by $(x+2)$ men in $(x-1)$ days are in the ratio 9 : 10 then the value of x is equal to:
(a) 5 (b) 6
(c) 7 (d) 8
72. One man, 3 women and 4 boys can do a piece of work in 96 hours 2 men and 8 boys can do it in 80 hours 2 men and 3 women can do it in 120 hours 5 men and 12 boys can do it in
(a) $39\frac{1}{11}$ hr. (b) $42\frac{7}{11}$ hr.
(c) $43\frac{7}{11}$ hr. (d) 44 hr.
73. If x men can do a piece of work in x days then the number of days in which y men can do the same work is
(a) xy days (b) $\frac{y^2}{x}$ days
(c) $\frac{x^2}{y}$ days (d) x^2y days
74. A contractor undertook to finish a work in 92 days and employed 110 men After 48 days he found that he had already done $\frac{3}{5}$ part of the work the number of men he can withdraw so that the work may still be finished in time is
(a) 45 (b) 40
(c) 35 (d) 30
75. A contractor undertook to finish a certain work in 124 days and employed 120 men. After 64 days he found that he had already done $\frac{2}{3}$ of the work. How many men can be discharged now so that the work may finish in time?
(a) 48 (b) 56
(c) 40 (d) 50
76. If 7 men working 7 hrs a day for each of 7 days produce 7 units of work then the units of work produced by 5 men working 5 hrs a day for each of 5 days is
(a) $\frac{25}{343}$ (b) $\frac{125}{49}$
(c) $\frac{49}{125}$ (d) $\frac{343}{25}$
77. The average wage of 500 workers was found to be Rs. 200 Later on it was discovered that the wages of two workers were misread as 180 and 20 instead of 80 and 220 The correct average wage is:
(a) Rs. 200.10 (b) Rs. 200.20
(c) Rs. 200.50 (d) Rs. 201.00
78. If 6 persons working 8 hours a days earn Rs. 8400 per week then 9 persons working 6 hours a days will earn per week
(a) Rs. 8400 (b) Rs. 16800
(c) Rs. 9450 (d) Rs. 16200
79. A, B and C completed a work costing Rs. 1,800 A worked for 6 days, B work for 4 days and C work for 9 days. If their daily wages are in the ratio of 5 : 6 : 4 how much amount will be received by A?
(a) Rs. 800 (b) Rs. 600
(c) Rs. 900 (d) Rs. 750
80. 2 men and 1 women together can complete a piece of work in 14 days while 4 women and 2 men together can do it in 8 days. If a man gets Rs. 600 per day how much should a woman get per day?
(a) Rs. 400 (b) Rs.450
(c) Rs. 480 (d) Rs.360
81. Two men undertake a job for Rs. 960 They can complete it in 16 days and 24 days respectively They work along with a third man and take 8 days to complete it Then the share of the third man should be
(a) Rs. 155 (b) Rs.165
(c) Rs. 160 (d) Rs. 150
82. Three persons undertake to complete a piece fo work for Rs. 1200. The first person can complete the work in 8 days second person in 12 days and third person in 16 days They complete the work with the help of a fourth person in 3 days What does the fourth person get?
(a) Rs. 180 (b) Rs.200
(c) Rs.225 (d) Rs.250
83. A skilled, half skilled and an unskilled labourer work for 7, 8 and 10 days respectively and they together get Rs. 369 for their work If the ratio of their each day's work is $\frac{1}{3} : \frac{1}{4} : \frac{1}{6}$ then how much does the trained labourer get (in rupees)?
(a) 164 (b) 102.50
(c) 201.50 (d) 143.50
84. If a man earns Rs. 2000 for his first 50 hours of work in a week and is then paid one and half times his regular hourly rate for any additional hours then the hours must he work to make Rs. 2300 in a week is
(a) 6 hours (b) 4 hours
(c) 7 hours (d) 5 hours
85. A certain number of men can complete a job in 30 days If there were 5 men more it could be completed in 10 days less How many men were in the beginning?
(a) 10 (b) 15
(c) 20 (d) 25



86. A job can be completed by 12 men in 12 days. How many extra days will be needed to complete the job if 6 men leave after working for 6 days?
(a) 3 days (b) 6 days
(c) 12 days (d) 24 days
87. 60 men can complete a piece of work in 250 days the work together for 200 days due to bad atmosphere the work stop for 10 days then how many more required to complete the work.
(a) 10 (b) 15
(c) 18 (d) 20
88. A contractor undertakes to make a road in 40 days and employs 25 men. After 24 days he finds that only one-third of the road is made How many extra men should he employ so that he is able to complete the work 4 days earlier?
(a) 100 (b) 60
(c) 75 (d) None of these
89. Two men can do a piece of work in x days. But y women can do that in 3 days. Then the ratio of the work done by 1 man and 1 woman is
(a) $3y : 2x$ (b) $2x : 3y$
(c) $x : y$ (d) $2y : 3x$
90. P and Q together can do a job in 6 days Q and R can finish the same job in $\frac{60}{7}$ days P started the work and worked for 3 days Q and R continued for 6 days Then the difference of days in which R and P can complete the job is
(a) 15 (b) 10
(c) 8 (d) 12
91. 150 workers were engaged to finish a piece of work in a certain number of days four workers dropped on the second day, four more workers dropped on third day and so on It takes 8 more days to finish the work now. Find the number of days in which the work was completed?
(a) 28 (b) 17
(c) 25 (d) 30
92. If 6 men and 8 boys can do a piece of work in 10 days and 26 men and 48 boys can do the same in 2 days then the time taken by 15 men and 20 boys to do the same type of work will be:
(a) 5 days (b) 4 days
(c) 6 days (d) 7 days
93. 5 men can do a piece of work in 6 days while 10 women can do it in 5 days. In how many days can 5 women and 3 men do it?
(a) 4 days (b) 5 days
(c) 6 days (d) 8 days
94. 4 men and 6 women can complete a work in 8 days, while 3 men and 7 women can complete it in 10 days In how many days will 10 women complete it?
(a) 50 days (b) 45 days
(c) 40 days (d) 35 days
95. If 10 men or 20 women of 40 children can do a piece of work in 7 months then 5 men 5 women and 5 children together can do half of the work in:
(a) 6 months (b) 4 months
(c) 5 months (d) 8 months
96. If 40 men or 60 women or 80 children can do a piece of work in 6 months, then 10 men 10 women and 10 children together do half of the work in
(a) $5\frac{6}{13}$ months
(b) 6 months
(c) $5\frac{7}{13}$ months
(d) $11\frac{1}{13}$ months
97. 3 men or 7 women can do a piece of work in 32 days The number of days required by 7 men and 5 women to do a piece of work twice as large is-
(a) 19 (b) 21
(c) 27 (d) 36
98. A can cultivate $\frac{2}{5}$ th of a land in 6 days and B can cultivate $\frac{1}{3}$ rd of the same land in 10 days. working together A and B can cultivate $\frac{4}{5}$ th of the land in:
(a) 4 days (b) 5 days
(c) 8 days (d) 10 days
99. A, B and C together earn Rs. 300 per day, while A and C together earn Rs. 188 and B and C together earn Rs. 152. Then daily earning of C is:
(a) Rs. 40 (b) Rs. 48
(c) Rs. 112 (d) Rs. 150
100. A, B and C are employed to do a piece of work for Rs. 529. A and B together are supposed to do $\frac{19}{23}$ of the work and B and C together $\frac{8}{23}$ of the work. What amount should A be paid?
(a) Rs. 316 (b) Rs. 345
(c) Rs. 355 (d) Rs. 375
101. Kim can do a work in 3 days while David can do the same work in 2 days. Both of them finish the work together and get Rs. 150. What is the share of Kim?
(a) Rs. 30 (b) Rs. 60
(c) Rs. 70 (d) Rs. 75
102. If A can do $\frac{1}{4}$ of a work in 3 days and B can do $\frac{1}{6}$ of the same work in 4 days, how much will A get if both work together and are paid Rs. 180 in all?
(a) Rs. 36 (b) Rs. 60
(c) Rs. 70 (d) Rs. 120
103. A alone can do a piece of work in 6 days and B alone in 8 days. A and B undertook to do it for Rs. 3200. With the help of C, they completed the work in 3 days. How much is to be paid to C?
(a) Rs. 375 (b) Rs. 400
(c) Rs. 600 (d) Rs. 800



104. A, B and C can do a piece of work for 6750 rupees. If they all work together they can finish it in 8 days. A and B can do the work in 12 days working together. B and C can do it in

$13\frac{1}{3}$ days working together.

Find their respective shares.

- (a) Rs 2700, Rs 1800, Rs 2250
(b) Rs 2700, Rs 1600, Rs 2450
(c) Rs 1800, Rs 2700, Rs 2450
(d) Rs 2700, Rs 2450, Rs 1800

105. A, B and C can do a piece of work in 90, 40 and 12 days respectively. If the work started on the first day by A, second day by B, third day by C and fourth day by A and so on. If they get Rs. 3600 for the whole work. Find their respective shares.

- (a) Rs. 360, Rs. 810, Rs. 2430
(b) Rs. 810, Rs. 360, Rs. 2430
(c) Rs. 2430, Rs. 810, Rs. 360
(d) None of these

106. Boston, Churchill and David are three workers, employed by a contractor. They completed the whole work in 10 days. Initially all of them worked together, but the last 60% of the work was completed by only Churchill and David together. Boston worked with Churchill and David only for initial two days then he left the work due

to his poor health. Also Churchill takes 20% less time to finish the work alone than that of David working alone. If they were paid Rs. 3000 for the entire work, then what is the share of the least efficient person?

- (a) Rs. 900 (b) Rs. 1200
(c) Rs. 1000 (d) none of these

107. Progressive Company Pvt. Ltd. hired some employees in a fix pattern. On the first day it hired one person, on the second day one more joined him. On the third, fourth etc (i.e. every next day) one more person increased in this group. The capacity of each person was same. The whole work was completed on the 24th day then out of total Rs. 5000, maximum how much a person had earned?

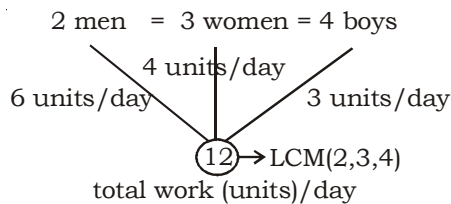
- (a) Rs. 500 (b) Rs. 400
(c) Rs. 200 (d) Rs. 250

ANSWER KEY

1. (a)	15. (a)	29. (d)	43. (a)	57. (d)	71. (a)	85. (a)	99. (c)
2. (d)	16. (d)	30. (c)	44. (d)	58. (a)	72. (c)	86. (c)	100. (a)
3. (a)	17. (a)	31. (a)	45. (b)	59. (a)	73. (c)	87. (b)	101. (b)
4. (a)	18. (a)	32. (a)	46. (a)	60. (d)	74. (d)	88. (c)	102. (b)
5. (d)	19. (d)	33. (a)	47. (a)	61. (d)	75. (b)	89. (a)	103. (d)
6. (b)	20. (b)	34. (a)	48. (c)	62. (b)	76. (b)	90. (b)	104. (b)
7. (d)	21. (c)	35. (a)	49. (a)	63. (d)	77. (b)	91. (b)	105. (a)
8. (b)	22. (b)	36. (b)	50. (b)	64. (a)	78. (c)	92. (b)	106. (a)
9. (c)	23. (c)	37. (c)	51. (a)	65. (a)	79. (b)	93. (b)	107. (c)
10. (c)	24. (b)	38. (b)	52. (a)	66. (a)	80. (a)	94. (c)	
11. (a)	25. (c)	39. (a)	53. (a)	67. (b)	81. (c)	95. (b)	
12. (a)	26. (b)	40. (a)	54. (b)	68. (b)	82. (c)	96. (c)	
13. (a)	27. (a)	41. (a)	55. (d)	69. (a)	83. (d)	97. (b)	
14. (a)	28. (d)	42. (c)	56. (d)	70. (a)	84. (d)	98. (b)	

Solution

1. (a)



Now we calculate the total work as follows :

total work = 12 × 52 units

Required time for (1 men + 1 woman + 1 boy)

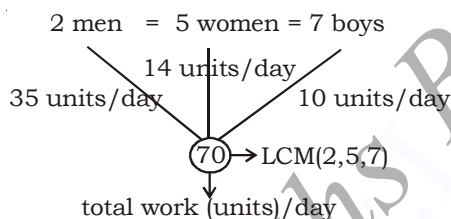
$$= \frac{\text{Total work}}{\text{total efficiency}}$$

$$= \frac{12 \times 52}{13} = 48 \text{ days}$$

Note :-

- (1) In such type of questions first calculate the efficiency of a man, a woman and a boy individually.
- (2) Then calculate the total work and apply the further procedure as above.

2. (d)



Now total work = 70 × 469 units

Required time for (7 men + 5 women + 2 boys)

$$= \frac{\text{Total work}}{\text{total efficiency}}$$

$$= \frac{70 \times 469}{(35 \times 7 + 5 \times 14 + 10 \times 2)}$$

$$= \frac{70 \times 469}{335} = 98 \text{ days}$$

3. (a) (6 children + 2 men) → 6 days according to the question,

Child	:	Man
Time → 2	:	1
Efficiency → 1	:	2

$$\left[\therefore T \propto \frac{1}{E} \right]$$

now we calculate total work units as follows:

Total work units

$$= (6 + 2 \times 2) \times 6 = 60 \text{ units}$$

Time taken by 5 men to finish

$$\text{the work} = \frac{60}{(5 \times 2)} = 6 \text{ days}$$

4. (a) Actual work = 450 man-days [given]

$$\text{new work} = 450 \times 3 \text{ man-days}$$

$$\text{men} = 27$$

$$\text{we know : } M_1 D_1 = M_2 D_2$$

$$450 \times 3 = 27 \times D_2$$

$$D_2 = 50 \text{ days}$$

5. (d) 33 men do the work = 30 days

$$\text{total work} = 33 \times 30 = 990 \text{ units}$$

according to the question,

$$44 + 43 + 42 + \dots = 990$$

It is a series of Arithmetic progression.

$$\text{we know, } \text{sum} = \frac{n}{2} [2a + (n-1)d]$$

$$a = 44, d = 43 - 44 = -1$$

$$990 = \frac{n}{2} [2 \times 44 + (n-1)-1]$$

after solving $n = 44$

6. (b) (7 Indian + 4 Chinese) × 5

$$= (7 \text{ Japanese} + 3 \text{ Chinese}) \times 7$$

Abbreviations:-

Indian → I, Chinese → C,
 Japanese → J]

$$(7I + 4C) \times 5 = (7J + 3C) \times 7$$

$$35I + 20C = 49J + 21C$$

$$35I = 49J + C$$

Note:- now assume the efficiency of all but it should be satisfy the above equation and also according to the question condition,

$$\text{Let } I = 2, J = 1, C = 21$$

$$\text{total work} = (7 \times 2 + 4 \times 21) \times 5 = 98 \times 5 \text{ units}$$

Required time for (1I + 1C + 1J)

$$= \frac{98 \times 5}{24} = \frac{245}{12} = 20 \frac{5}{12} \text{ days}$$

Alternatively:-

$$\text{One day's work of } (7I + 4C) = \frac{1}{5}$$

$$\text{One day's work of } (7J + 3C) = \frac{1}{7}$$

Therefore, one day's work of (7 Indian + 7 Chinese + 7

$$\text{Japanese}) = \frac{1}{5} + \frac{1}{7} = \frac{12}{35}$$

Therefore, one days work of (1 Indian + 1 Chinese + 1

$$\text{Japanese}) = \frac{12}{35} \times \frac{1}{7}$$

∴ Number of days required for (1I + 1C + 1J)

$$= \frac{35 \times 7}{12} = \frac{245}{12} = 20 \frac{5}{12} \text{ days}$$

7. (d) One day's work of

$$(4m + 2b) = \frac{1}{5}$$

$$\text{one day's work of } (3w + 4b) = \frac{1}{5}$$

$$\text{one day's work of } (2m + 3w) = \frac{1}{5}$$

Therefore, one day's work of (6m + 6w + 6b)

$$= \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{3}{5}$$

one day's work of

$$(1m + 1w + 1b) = \frac{3}{5 \times 6} = \frac{1}{10}$$

Required time for

$$(1m + 1w + 1b) = 10 \text{ days}$$

But according to question,

Note:- The efficiency is double then the time would be half.

$$\text{Required time} = \frac{1}{2} [10] = 5 \text{ days.}$$

8. (b)

Typist	: Composer	: Binder
16	: 10	: 15
8	: 12	: 12

In 1 hr. 128 1200 180

In 10hrs. 1280 1200 1800

Since, restriction is imposed by composers be since only 1200 books can be composed in 10 hours so not more than 1200 books can be finally prepared.

9. (c) $(8m + 5w) \times 6 \times 4$

$$= (4m + 5w) \times 8 \times 5$$

$$24m + 15w = 20m + 25w$$

$$4m = 10w$$

$$2m = 5w \Rightarrow \frac{m}{w} = \frac{5}{2}$$

[where m → man, w → woman]

$$\text{Total work} = (40 + 10) \times 24$$

$$= 1200 \text{ units}$$

According to the question,

$$5b \times 8 \times 30 = 1200$$

$$\Rightarrow b = 1 \quad [\because b \rightarrow \text{Boy}]$$

Time taken by $(4m + 3w + 4b)$ to complete the work when they worked 5 hours everyday

$$= \frac{1200}{(20+6+4) \times 5} = \frac{1200}{150} = 8 \text{ days}$$

10. (c) Let the 2 men would do the work in x days then time taken by 3 women = $(x + 5)$ days.

$$2 \text{ men} \rightarrow x \text{ days}$$

$$3 \text{ men} \rightarrow \frac{2x}{3} \text{ days}$$

Similarly:-

$$3 \text{ women} \rightarrow (x+5) \quad 1 \text{ woman} \rightarrow 3(x+5)$$

$$5 \text{ women} \rightarrow \frac{3}{5}(x+5) \text{ days}$$

According to the question:

$$\frac{3}{2x} + \frac{5}{3(x+5)} = \frac{1}{3}$$

$$\Rightarrow \frac{9x + 45 + 10x}{6x(x+5)} = \frac{1}{3}$$

$$\Rightarrow \frac{19x + 45}{6x^2 + 30x} = \frac{1}{3}$$

$$57x + 135 = 6x^2 + 30x$$

$$6x^2 - 27x - 135 = 0$$

$$6x^2 - 45x + 18x - 135 = 0$$

$$3x(2x - 15) + 9(2x - 15) = 0$$

$$x = \frac{15}{2}, x = -3$$

Time taken by man

$$= \frac{15}{2} \times 2 = 15$$

Time taken by woman

$$= 3\left(\frac{15}{2} + 5\right) = \frac{25}{2} \times 3 = \frac{75}{2}$$

Man : Woman

$$\text{Time} \rightarrow 15 : \frac{75}{2}$$

$$E \rightarrow \frac{75}{2} : 15$$

Ratio of efficiency of man : woman = 5 : 2

Note:- In such type of questions take help from options to save your valuable time for further details check earlier examples.

11. (a) Ratio of work of 1 man, 1 woman and 1 boy = 4 : 3 : 2

$\therefore$ Ratio of work of 16 men, 18 women, and 24 boys

$$= 16 \times 4 : 3 \times 18 : 24 \times 2$$

$$= 64 : 54 : 48$$

$$= 32 : 27 : 24$$

 $\therefore$ Weekly wages of 16 men

$$= \frac{13944}{(32 + 27 + 24)} \times 32 = \text{Rs. } 5376$$

Weekly wages of 18 women

$$= \frac{13944}{83} \times 27 = \text{Rs. } 4536$$

Weekly wages of 24 boys

$$= \frac{13944}{83} \times 24 = \text{Rs. } 4032$$

Per day wages of a man

$$= \frac{5376}{16 \times 7} = \text{Rs. } 48$$

Per day wages of a woman

$$= \frac{4536}{18 \times 7} = \text{Rs. } 36$$

Per day wages of a boy

$$= \frac{4032}{24 \times 7} = \text{Rs. } 24$$

 $\therefore$ Annual wages of 36

men, 24 women and 20 boys

$$= (48 \times 36 + 36 \times 24 + 24 \times 20) \times 365$$

$$= (1728 + 864 + 480) \times 365$$

$$= 3072 \times 365 = \text{Rs. } 1121280$$

Alternatively:-

Try to think like that in this question we are asking about annual wages. It means finding per day wages we multiply the answer by 365 for finding annual wages. So we can say answer will be the multiple of 365 and all its factors. So pick options and check divisibility.

12. (a) 1 Man can do the work

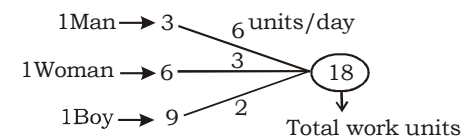
$$= 1 \times 3 = 3 \text{ days}$$

1 Woman can do the work

$$= \frac{3}{4} \times 8 = 6 \text{ days}$$

1 Boy can do the work

$$= \frac{1}{2} \times 18 = 9 \text{ days}$$



According to the question :-

(3 women + 3 boys) one day

$$\text{work} = 3(3 + 2) = 15 \text{ units}$$

$$\text{Remaining work} = (18 - 15)$$

$$= 3 \text{ units}$$

Required time for 1 man

$$= \frac{3}{6} = \frac{1}{2} \text{ day}$$

So 1 man can do the remaining

work in $\frac{1}{2}$ day.13. (a) According to the question:-
[m → man, b → boy, w → woman]

$$16m \times 8 = 12b \times 24$$

$$m : b$$

$$9 : 4$$

Now total work

$$= (8 \times 9 + 12 \times 4) \times 12$$

$$= (72 + 48) \times 12$$

$$= 120 \times 12 = 1440 \text{ units}$$

Required time for completing thrice the work for 40 men and 45 boys

$$= \frac{1440 \times 3}{(40 \times 9 + 45 \times 4)}$$

$$= \frac{1440 \times 3}{540} = 8 \text{ days}$$

14. (a) According to the question :-

$$\text{Total work} = \frac{200 \times 10 \times 6}{5}$$

$$= 2400 \text{ units}$$

$$10 \text{ days work} = 2400 \times \frac{5}{6}$$

$$= 2000 \text{ units}$$

Due to rain, destroyed work

$$= 2000 \times \frac{2}{5} = 800 \text{ units}$$

$$\text{Total work to be done} = (2400 - 2000) + 800 = 1200 \text{ units}$$

Required time for 150 men

$$= \frac{1200}{150} = 8 \text{ days}$$

Total time taken in completion of work

$$= 10 + 20 + 8 = 38 \text{ days}$$

15. (a) We know :-

$$\frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}$$

Now according to the question.

$$1600 \times 50 \times 900$$

$$= 1200 \times 1000 \times D$$

$$D = \frac{1600 \times 50 \times 900}{1200 \times 1000} = 60 \text{ days}$$

16. (d) Let the number of soldiers = M
Let the number of days = D
according to the question,

$$M \times (D - 20) = \frac{3}{4} M \times D$$

$$4MD - 80M = 3MD$$

$$D = 80 \text{ days}$$

17. (a) According to the question:-

$$\text{Total work} = 20 \times 18 = 360 \text{ units}$$

$$\text{Work done by 20 men in 3 days} = 3 \times 20 = 60 \text{ units}$$

after joining of 5 men then total men = 25

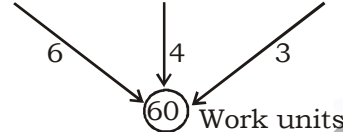
$$\text{Remaining work} = 360 - 60 = 300 \text{ units}$$

$$\text{Now Required time} = \frac{300}{25}$$

$$= 12 \text{ days}$$

18. (a) According to the question :

$$10 \text{ men} = 15 \text{ women} = 20 \text{ boys}$$



Now we find total work as :-

$$\text{Total work} = 60 \times 6 \times 60$$

$$= 21600 \text{ units}$$

Required time for (10 men + 15 women + 20 boys)

$$\Rightarrow \frac{21600}{(10 \times 6 + 15 \times 4 + 20 \times 3) \times 15}$$

$$\Rightarrow \frac{21600}{(60 + 60 + 60) \times 15}$$

$$\Rightarrow \frac{21600}{180 \times 15}$$

$$\Rightarrow 8 \text{ hours}$$

19. (d) [M = Man, C = Children]

$$25 M \times 10 = 20 C \times 50$$

$$1 M = 4 C$$

The work done by 1 man

$$= 25 \times 10 = 250 \text{ days}$$

Work done by 5 men in 10 days = 50 units

Work left to be done in 20 days = 200 units

It required 10 men per day to work but we have only 5 men and Require 5 men more.

Hence 5 men = 20 Children.

20. (b) We know:-

[Wages $\propto$ Work efficiency]

Now, 5 Men = 8 Women = 10 Boys

Men : Women : Boys

Ratio of $\rightarrow 8x : 5x : 4x$
efficiency

$$\text{So, } 6 \times 8x + 8 \times 5x + 4 \times 4x = 520$$

$$x = 5$$

$$\text{Wages of a man} = 8 \times 5 = 40 \text{ Rs.}$$

$$\text{Wages of a woman} = 5 \times 5 = 25 \text{ Rs.}$$

$$\text{Wages of a boy} = 4 \times 5 = 20 \text{ Rs.}$$

$$\text{Hence, Total wages} = 7 \times 40 + 6 \times 25 + 10 \times 20$$

$$= 630 \text{ Rs.}$$

$$21. (c) \frac{5}{1400} \times (6m + 5c)$$

$$= \frac{8}{3040} \times (8m + 7c)$$

$$2m = 3c$$

Now let it takes D days to earn Rs. 720 for 4 men and children.

$$\frac{5}{1400} \times (6m + 5c)$$

$$= \frac{D}{720} \times (4m + 3c)$$

$$= \frac{5}{1400} \times (9c + 5c)$$

$$= \frac{D}{720} \times (6c + 3c)$$

$$D = 4 \text{ days}$$

$$22. (b) \frac{(9m + 20w) \times \frac{5}{4} \times 9}{\frac{3}{4}}$$

$$= \frac{(7m + 46w) \times \frac{1}{4} \times 5}{\frac{1}{4}}$$

$$1m = 2w$$

$$\text{Now, } \frac{(7m + 46w) \times \frac{1}{4} \times 5}{\frac{1}{4}}$$

$$= \frac{(13m + 14w) \times \frac{1}{2} \times D}{1}$$

$$\Rightarrow \frac{(14w + 46w) \times \frac{1}{4} \times 5}{\frac{1}{4}}$$

$$= \frac{(26w + 14w) \times \frac{1}{2} \times D}{1}$$

$$D = 15 \text{ days}$$

23. (c) $(3m + 5w) \times \frac{20}{25}$

$$= (2m + 6w) \times \frac{40}{40}$$

$$1m = 5w$$

$$\frac{m}{w} = \frac{5}{1}$$

Ratio of efficiency man : woman
= **5 : 1**

24. (b) Earning of 1 man per day

$$= \frac{150}{3} = \text{Rs. } 50$$

Earning of 1 woman per day

$$= \frac{150}{4} = \text{Rs. } \frac{75}{2}$$

Earning of 1 boy per day

$$= \frac{150}{5} = \text{Rs. } 30$$

Earnings of (7men + 12 women + 3 boys)

$$= 7 \times 50 + 12 \times \frac{75}{2} + 3 \times 30$$

$$= 350 + 450 + 90 = \text{Rs. } 950$$

25. (c) Let the number of required days = D

$$\frac{(3m + 4b) \times 7}{756}$$

$$= \frac{(11m + 13b) \times 8}{3008}$$

$$282m + 376b = 297m + 351b$$

$$15m = 25b \quad \boxed{\frac{m}{b} = \frac{5}{3}}$$

According to the question,

$$\frac{(3 \times 5 + 4 \times 3) \times 7}{756}$$

$$= \frac{(7 \times 5 + 9 \times 3)}{2480} \times D$$

$$D = 10 \text{ days}$$

26. (b) Let the number of Days = D_2

$$\frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}$$

$$\frac{20 \times 4}{30} = \frac{(20 - 4) \times 6}{x}$$

$$\frac{80}{30} = \frac{16 \times 6}{x}$$

$$x = 36 \text{ trees}$$

27. (a) Let the number of Days
= D_2

$$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$$

$$\frac{5 \times 6 \times 6}{10} = \frac{12 \times D_2 \times 8}{16}$$

$$D_2 = \frac{5 \times 6 \times 6 \times 16}{10 \times 12 \times 8}$$

$$D_2 = 3 \text{ days}$$

28. (d) Let the number of Days = D_2
According to question

$$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$$

$$\frac{10 \times 3 \times 12}{20} = \frac{24 \times 4 \times D_2}{32}$$

$$= 18 = 3D_2 = 6 \text{ days}$$

29. (d) Let the number of Days = D_2

$$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$$

$$\frac{20 \times 24 \times 18}{40} = \frac{36 \times D_2 \times 16}{48}$$

$$D_2 = \frac{20 \times 24 \times 18 \times 48}{40 \times 36 \times 16}$$

$$D_2 = 18 \text{ days}$$

30. (c) Men $\rightarrow 15$ $\begin{matrix} 4 \\ 5 \end{matrix}$ $\rightarrow 60$
Women $\rightarrow 12$

Total Time required by (10 men + 15 women) to complete the whole work

$$= \frac{60}{4+5} = \frac{60}{9} = 6 \frac{2}{3} \text{ days}$$

31. (a) 1 men complete the work
= $2 \times 5 = 10$ hours

1 women complete the work

$$= 7 \times 3 = 21 \text{ hours}$$

1 children complete the work

$$= 9 \times 4 = 36 \text{ hours}$$

$$\begin{array}{lcl} \text{Men} & \rightarrow & 10 \quad 126 \\ \text{Women} & \rightarrow & 21 \quad 60 \\ \text{Children} & \rightarrow & 36 \quad 35 \end{array} \rightarrow 1260$$

1 men, 1 woman and 1 child together complete the work

$$= \frac{\text{Total work}}{\text{Total Efficiency}}$$

$$= \frac{1260}{126 + 60 + 35} = \frac{1260}{221} \text{ hours}$$

32. (a) $(12m + 16B) \times 5 = (13m + 24B) \times 4$
 $60m + 80B = 52m + 96B$
 $8M = 16B$

$$\frac{M}{B} = \frac{2}{1}$$

$$\text{Total unit} = (12M + 16B) \times 5$$

$$= (12 \times 2 + 16 \times 1) \times 5$$

$$= (24 + 16) \times 5 = 200 \text{ units}$$

7Men and 10 Boys

$$= \frac{200}{7 \times 2 + 10 \times 1}$$

$$= \frac{200}{14 + 10} = \frac{200}{24} = \frac{25}{3}$$

$$= 8 \frac{1}{3} \text{ days}$$

33. (a) $(16M + 12B) \times 5 = (24M + 13B) \times 4$

$$80M + 60B = 96M + 52B$$

$$8B = 16M$$

$$\frac{M}{B} = \frac{1}{2}$$

34. (a) 3Men = 5 boys

$$\frac{\text{Men}}{\text{Boy}} = \frac{5}{3}$$

$$\begin{aligned}\text{Total work} &= (30M + 14B) \times 21 \\ &= (30 \times 5 + 14 \times 3) \times 21 \\ &= (150 + 42) \times 21 \\ &= 192 \times 21 = 4032 \text{ units} \\ 20 \text{ men and 4 boys}\end{aligned}$$

$$= \frac{4032}{20 \times 5 + 4 \times 3}$$

$$= \frac{4032}{112} = 36 \text{ days}$$

$$\begin{aligned}35. \quad (a) \quad (5M + 2B) &= 4(1M + B) \\ 5M + 2B &= 4M + 4B \\ 1M &= 2B\end{aligned}$$

$$\frac{M}{B} = \frac{2}{1}$$

$$36. \quad (b) \quad (2M + 3B) 6 = (11M + 5B) \times \frac{3}{2}$$

$$12M + 18B = \frac{33}{2}M + \frac{15}{2}B$$

$$\frac{33}{2}M - 12M = 18B - \frac{15}{2}B$$

$$\frac{9}{2}M = \frac{21}{2}B$$

$$\frac{M}{B} = \frac{21}{9} = \frac{7}{3} = \frac{B}{M} = \frac{3}{7}$$

$$\begin{aligned}37. \quad (c) \quad [C - \text{Children, } M - \text{Men}] \\ 1M = 2 \times C\end{aligned}$$

$$\frac{M}{C} = \frac{2}{1}$$

$$\begin{aligned}\text{Total work} &= (8C + 12M) \times 9 \\ &= (8 \times 1 + 12 \times 2) \times 9 \\ &= (8 + 24) \times 9 = 288 \text{ units} \\ 12 \text{ Men finished the work}\end{aligned}$$

$$= \frac{288}{12 \times 2} = \frac{288}{24} = 12 \text{ days}$$

$$\begin{aligned}38. \quad (b) \quad \text{Let the number of men} &= x \\ 1 \text{ Men complete the work} &= 45 \times x \text{ days}\end{aligned}$$

A.T.Q

$$45x = (x - 4) \times (45 + 15)$$

$$45x = (x - 4) \times 60$$

$$3x = (x - 4) \times 4$$

$$3x = 4x - 16$$

$$x = 16 \text{ men}$$

$$\begin{aligned}39. \quad (a) \quad \text{Let the number of men} &= x \\ 1 \text{ men complete a work} &= 30x \text{ days}\end{aligned}$$

A.T.Q

$$30 \times x = (x - 6)(30 + 20)$$

$$30x = 50x - 300$$

$$20x = 300$$

$$x = 15 \text{ men}$$

$$40. \quad (a) \quad (6M + 3B) = 2(2M + 2B)$$

$$6M + 3B = 4M + 4B$$

$$2M = 1B$$

$$\frac{M}{B} = \frac{1}{2}$$

$$\begin{aligned}41. \quad (a) \quad 1M &\rightarrow 44 \xrightarrow{6} \\ 1W &\rightarrow 88 \xrightarrow{3} \\ 1B &\rightarrow 132 \xrightarrow{2} \end{aligned} \rightarrow 264$$

$$1M + 1W + 1B$$

$$= \frac{\text{Total work}}{\text{Total Efficiency}} = \frac{264}{11}$$

$$= 24 \text{ days}$$

$$\begin{aligned}42. \quad (c) \quad 1M &\rightarrow 47 \times 3 = 141 \text{ days} \xrightarrow{20} \\ 1W &\rightarrow 47 \times 4 = 188 \text{ days} \xrightarrow{15} \\ 1B &\rightarrow 47 \times 5 = 235 \text{ days} \xrightarrow{12} \end{aligned} \rightarrow 2820$$

$$1M + 1W + 1B \text{ complete the}$$

$$\text{work} = \frac{2820}{20 + 15 + 12} = \frac{2820}{47}$$

$$= 60 \text{ days}$$

$$\begin{aligned}43. \quad (a) \quad 1M &\rightarrow 38 \times 1 = 38 \text{ days} \xrightarrow{12} \\ 1W &\rightarrow 38 \times 3 = 114 \text{ days} \xrightarrow{4} \\ 1B &\rightarrow 38 \times 4 = 152 \text{ days} \xrightarrow{3} \end{aligned} \rightarrow 456$$

$$1M + 1W + 1B = \frac{456}{12 + 4 + 3}$$

$$= \frac{456}{19} = 24 \text{ days}$$

Alternate:-

This type of question we assume Total person in work is number of Days.

$$\begin{aligned}\text{Men} &\rightarrow 1 \xrightarrow{12} \\ \text{Women} &\rightarrow 3 \xrightarrow{4} \\ \text{Children} &\rightarrow 4 \xrightarrow{3} \end{aligned} \rightarrow 12$$

$$1M + 1W + 1B = (12 + 4 + 3) \text{ units}$$

$$= \frac{12}{12 + 4 + 3} = \frac{12}{19}$$

then, we multiply by 38

$$= \frac{12}{19} \times 38 = 24 \text{ days}$$

$$\begin{aligned}44. \quad (d) \quad \text{Men} &\rightarrow 1 \xrightarrow{4} \\ \text{Women} &\rightarrow 2 \xrightarrow{2} \\ \text{Children} &\rightarrow 4 \xrightarrow{1} \end{aligned} \rightarrow 4$$

$$1M + 1W + 1B = \frac{4}{4 + 2 + 1} = \frac{4}{7}$$

then, we multiply by 56

$$= \frac{4}{7} \times 56 = 32 \text{ days}$$

$$45. \quad (b) \quad \text{Let the original number of men} = x$$

A.T.Q

$$x \times 12 = (x - 8) 20$$

$$3x = 5x - 40$$

$$2x = 40$$

$$x = 20 \text{ men}$$

$$46. \quad (a) \quad \text{Let the original number of men} = x$$

A.T.Q

$$x \times 15 = (x - 2) \times 25$$

$$3x = 5x - 10$$

$$2x = 10$$

$$x = 5 \text{ men}$$

$$47. \quad (a) \quad \text{Let the number of men} = x$$

A.T.Q

$$x \times 60 = (x + 8) \times 50$$

$$6x = 5x + 40$$

$$x = 40 \text{ men}$$

$$48. \quad (c) \quad \text{Let the number of men} = x$$

A.T.Q

$$x \times 50 = (x + 3) \times 45$$

$$10x = 9x + 27$$

$$x = 27 \text{ men}$$

$$49. \quad (a) \quad \text{Let the number of original days} = x$$

A.T.Q

$$100 \times x$$

$$= 100 \times 35 + (100 + 100) \times 5$$

$$100x = 3500 + 1000$$

$$x = \frac{4500}{100} = 45 \text{ days}$$

$$\text{Extra days} = 45 - 40 = 5 \text{ days}$$

50. (b) Let the number of days food for the rest men = x days

A.T.Q

$$200 \times 3 = 60 \times x$$

$$x = 10 \text{ days}$$

51. (a) Let the number of days delayed work = x

A.T.Q

$$30 \times 25 + 35 \times 12 = 30 \times x$$

$$750 + 420 = 30x$$

$$x = \frac{1170}{30} = 39 \text{ days}$$

$$\text{Delayed days} = 39 - 38 = 1 \text{ day}$$

52. (a) Let the number of days delayed work = x

A.T.Q

$$25 \times 18 + 27 \times 25 = 25 \times x$$

$$18 + 27 = x$$

$$x = 45 \text{ days}$$

$$\text{Delayed days} = 45 - 44 = 1 \text{ day}$$

53. (a) $M_1 \times T_1 = M_2 \times T_2$
 $2M_1 \times 1 = 3M_2 \times 1.5$

$$\frac{M_1}{M_2} = \frac{4.5}{2} = \frac{9}{4}$$

[Efficiency of man group]

A.T.Q

$$\frac{M_1 D_1 T_1}{W_2} = \frac{M_2 D_2 T_2}{W_2}$$

$$\frac{(38 \times 9) \times 12 \times 6}{1}$$

$$= \frac{(57 \times 4) \times D_2 \times 8}{2}$$

$$D_2 = \frac{38 \times 9 \times 12 \times 6 \times 2}{57 \times 4 \times 8}$$

$$D_2 = 27 \text{ days}$$

54. (b) 24 men $\times$ 16
 = 32 women $\times$ 24

$$\frac{\text{men}}{\text{women}} = \frac{32 \times 24}{24 \times 16} = \frac{2}{1}$$

$$\text{Total work} = 24 \times 2 \times 16$$

$$= 768 \text{ units}$$

$$(16 \text{ men} + 16 \text{ women}) \times 14 + 2 \times 2 \times x = 768$$

$$(16 \times 2 + 16 \times 1) \times 14 + 4x = 768$$

$$48 \times 14 + 4x = 768$$

$$4x = 768 - 672$$

$$x = \frac{96}{4} = 24 \text{ men}$$

More men added to complete the remaining work = 24

55. (d) $(25M \times 15W) \times 12$

$$= (25M + 15W) \times 8 + 25M \times 6$$

$$300M + 180W = 200M + 120W + 150M$$

$$60W = 50M$$

$$\frac{M}{W} = \frac{6}{5}$$

A.T.Q

$$(25 \times 6 + 15 \times 5) \times 12 = 15 \times 5 \times x$$

$$(150 + 75) \times 12 = 75x$$

$$x = \frac{225 \times 12}{75} = 36$$

56. (d) $(10M + 15W) \times 6 = 1M \times 100$

$$60M + 90W = 100M$$

$$90W = 40M$$

$$\frac{M}{W} = \frac{9}{4}$$

A.T.Q

$$1 \times 9 \times 100 = 1 \times 4 \times x$$

$$x = 225 \text{ days}$$

• Women finish the work = 225

days

57. (d) $12M \times 18 = 12W \times 18$

$$\frac{M}{W} = \frac{1}{1}$$

A.T.Q

$$\frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}$$

$$\frac{12 \times 1 \times 18}{1}$$

$$= \frac{(10 \times 1 + 8 \times 1) \times 4 \times x}{3}$$

$$x = \frac{12 \times 18 \times 3}{18 \times 4}$$

$$x = 9 \text{ days}$$

$$10 \text{ men and } 8 \text{ women}$$

complete $\frac{3}{4}$ work in 9 days

58. (a) $\frac{(5M + 3B) \times 4}{23}$

$$= \frac{(3M + 2B) \times 2}{7}$$

$$140M + 84B = 138M + 92B$$

$$2M = 8B$$

$$\frac{M}{B} = \frac{4}{1}$$

A.T.Q

$$\frac{(5 \times 4 + 3 \times 1) \times 4}{23}$$

$$= \frac{(7 \times 4 + 1 \times x) \times 6}{45}$$

$$\frac{23 \times 4}{23} = \frac{(28 + x) \times 6}{45}$$

$$x = 30 - 28 = 2 \text{ days}$$

Number of boys must assist = 2

59. (a) $A = \frac{75}{25} = 2 \text{ pages/hr}$

$$A + B = \frac{135}{27} = 5 \text{ pages/hr}$$

$$B = 5 - 3 = 2 \text{ pages/hr}$$

$$B \text{ copy } 42 \text{ pages} = \frac{42}{2} = 21 \text{ hrs.}$$

60. (d) Let the number of days to complete the remaining work = x

A.T.Q

$$12 \times 3 + 16 \times x = 12 \times 9$$

$$16x = 108 - 36$$

$$x = \frac{72}{16} = \frac{9}{2} = 4.5 \text{ days}$$

61. (d) Factory A out car in 1 hr = x
 Factory B out car in 1 hr

$$= \frac{y}{2}$$

Both together in 1 hr

$$= \left(x + \frac{y}{2} \right)$$

Both together in 8 hrs

$$= 8 \left(x + \frac{y}{2} \right) = 8x + 4y$$

62. (b) Factory A out car in 1 hr

$$= \frac{x}{9}$$

$$\text{Factory B out car in 1 hr} = \frac{y}{4}$$

$$\text{Both together in 1 hr} = \frac{x}{9} + \frac{y}{4}$$

Both together in 18 hr

$$= 18 \left(\frac{x}{9} + \frac{y}{4} \right) = 2x + \frac{9y}{2}$$

63. (d) Wages of 1 boy in 1 day

$$= \frac{9000}{15 \times 20} = 30$$

$$\text{Men wages in 1 day} = 30 \times \frac{3}{2}$$

$$= \text{Rs.45}$$

$$\text{Number of men} = \frac{13500}{30 \times 45}$$

$$= 10 \text{ men}$$

64. (a) $3M + 4B = \text{Rs. 2100}$ in 7 days(i)

$11M + 13B = \text{Rs.8300}$ in 8 days(ii)

$$\frac{M_1 \times D_1}{\text{Wages}_1} = \frac{M_2 \times D_2}{\text{Wages}_2}$$

$$\frac{(3M + 4B) \times 7}{2100} = \frac{(11M + 13B) \times 8}{8300}$$

$$\frac{3M + 4B}{3} = \frac{(11M + 13B) \times 8}{83}$$

$$249M + 332B = 264M + 312B$$

$$\boxed{3M = 4B}$$

From equation (i)

$$\frac{(3M + 4B) \times 7}{2100}$$

$$= \frac{\left(\frac{28}{3}B + 9B \right) \times D_2}{11000}$$

$$\frac{8B \times 7}{2100} = \frac{55B \times D_2}{3 \times 11000}$$

$$D_2 = 16 \text{ days}$$

$$65. (a) (A + B + C) 1 \text{ day} = \frac{1350}{9}$$

$$= \text{Rs. 150}$$

$$(A + C) 1 \text{ day} \frac{470}{5} = \text{Rs. 94}$$

$$(B + C) 1 \text{ day} = \frac{760}{10} = \text{Rs. 76}$$

$$\begin{aligned} \text{C's daily earning} &= (A + B) \\ &+ (B + C) - (A + B + C) \\ &= 94 + 76 - 150 = \text{Rs. 20} \end{aligned}$$

66. (a)

$$\frac{(5M + 5W) \times 3}{660} = \frac{(10M + 20W) \times 5}{3500}$$

$$70(5M + 5W) = 22(10M + 20W)$$

$$350M + 350W = 220M + 440W$$

$$130M = 90W$$

$$\frac{M}{W} = \frac{9}{13}$$

According to question

$$\frac{(5M + 5W) \times 3}{660} = \frac{(6M + 4W) \times x}{1060}$$

$$53 \times (45 + 65) = 11 \times (54 + 52) \times x$$

$$110 \times 53 = 11 \times 106 \times x$$

$$x = 5 \text{ days}$$

$$67. (b) \frac{(4B + 6B) \times 5}{1600} = \frac{(3M + 7B) \times 6}{1740}$$

$$87(4M + 6B) = 96(3M + 7B)$$

$$348M + 522B = 288M + 672B$$

$$60M = 150B$$

$$\frac{M}{B} = \frac{5}{2}$$

According to question

$$\frac{(4M + 6B) \times 5}{1600} = \frac{(7M + 6B) \times x}{3760}$$

$$\frac{(20 + 12) \times 5}{1600} = \frac{(35 + 12) \times x}{3760}$$

$$x = \frac{376}{47}$$

$$x = 8 \text{ days}$$

68. (b) Let x be the days

$$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$$

$$39 \text{ person} \times 12 \text{ days} \times 5 \text{ Hrs}$$

$$= 30 \text{ person} \times 6 \text{ Hrs} \times x$$

$$x = 13 \text{ days}$$

69. (a) Let x be the men required

$$\frac{72 \text{ Men} \times 21 \text{ days}}{280 \text{ m}} = \frac{x \times 18}{100 \text{ m}}$$

$$x = 30 \text{ men.}$$

70. (d) Let x be the number of mats woven

$$\frac{4M \times 4}{4} = \frac{8 \times 8}{x}$$

$$x = 16 \text{ mats}$$

71. (d) This type of questions we solve by the options that's easy way to solve

By **M.D.H**

$$(x-1)(x+1) = (x+2)(x-1)$$

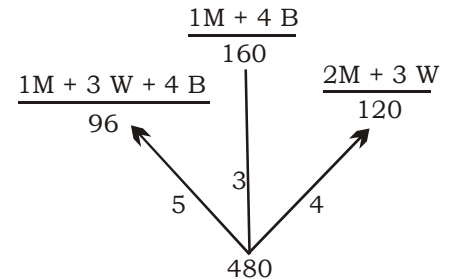
Put the options are by one that's because Ratio should be 9 : 10 i.e. Option "d" satisfy 8

72. (c) 1 man + 3 women + 4 Boys = 96 hr.

$$2 \text{ men} + 8 \text{ Boys} = 80 \text{ hr.}$$

$$\Rightarrow 1 \text{ Man} + 4 \text{ Boys} = 160 \text{ hr.}$$

$$2 \text{ men} + 3 \text{ women} = 120 \text{ hr.}$$



$$1M + 3W + 4B = 5 \text{ Units} \quad \dots(i)$$

$$1M + 4B = 3 \text{ Units} \quad \dots(ii)$$

$$2M + 3W = 4 \text{ Units} \quad \dots(iii)$$

Solving equation (i), (ii) and (iii), we get,

$$W = \frac{2}{3}$$

$$M = 1$$

$$B = \frac{1}{2}$$

Now,

$$5M + 12B = 5 \times 1 + 12 \times \frac{1}{2}$$

$$= 11 \text{ Units}$$

$$\text{Total work} = 480 \text{ Units}$$

$$\text{time taken by 5 Men + 12 Boys}$$

$$= \frac{480}{11} = 43 \frac{7}{11} \text{ days.}$$

73.(c) $x \text{ man} \times x \text{ days} = y \text{ men} \times T$

$$T = \frac{x^2}{y}$$

74.(d) Let x be the number of men after withdrawn

$$\frac{110 \text{ men} \times 48 \text{ days}}{\frac{3}{5} \text{ part}}$$

$$= \frac{x \times 44 \text{ days}}{\frac{2}{5}}$$

$$x = 80$$

Number of man withdrawn

$$= 110 - 80 = 30$$

75. (b) Let x be the number of men after withdrawn

$$\frac{120 \text{ men} \times 64 \text{ days}}{\frac{2}{3}}$$

$$= \frac{x \times 60}{\frac{1}{3}}$$

$$x = 64 \text{ men.}$$

$$\text{discharged man} = 120 - 64 = 56$$

76.(b) Let x be the units of work

$$\frac{7 \text{ men} \times 7 \text{ hrs} \times 7 \text{ days}}{7 \text{ unit}}$$

$$= \frac{5 \text{ men} \times 5 \text{ hrs} \times 5 \text{ days}}{x}$$

$$= x = \frac{125}{49}$$

77.(b) Total wages = 500×200

$$= 100000$$

Required Avg

$$= \frac{(100000 - 180 - 20 + 80 + 220)}{500}$$

$$= \frac{100100}{500} = 200.20$$

78.(c) $\frac{6 \text{ person} \times 8 \text{ Hrs}}{8400}$

$$= \frac{9 \text{ person} \times 6 \text{ Hrs}}{x}$$

$$x = \frac{8400 \times 54}{48} = \text{Rs. } 9450$$

79. (b) Wages of

$$\begin{array}{ccc} A & : & B & : & C \\ 5 \times 6 & : & 6 \times 4 & : & 4 \times 9 \\ 30 & : & 24 & : & 36 \\ = 5 : 4 & : & 6 \end{array}$$

$$A = \frac{5}{15} \times 1800 = \text{Rs. } 600$$

80. (a) (2Men + 1 women) 14
= (4 women + 2 men) 8
 $28 \text{ m} + 14 \text{ w} = 32 \text{ w} + 16 \text{ m}$
 $12 \text{ m} = 18 \text{ w}$

$$\frac{M}{W} = \frac{18}{12} = \frac{3}{2}$$

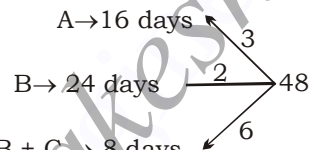
$$\text{man wage} = 3 \text{ unit} = 600$$

$$1 \text{ unit} \rightarrow 200$$

$$\text{Wages of women} = 2 \text{ Unit}$$

$$= 2 \times 200 = 400$$

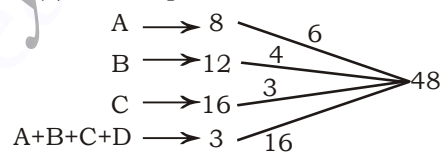
81. (c)



$$\begin{array}{l} A + B + C \rightarrow 8 \text{ days} \\ C = 6 - 3 + 2 = 1 \text{ Unit} \\ \text{Wages Ratio} = 3 : 2 : 1 \end{array}$$

$$\begin{aligned} \text{Share of third Man} &= \frac{1}{6} \times 960 \\ &= ₹160 \end{aligned}$$

82.(c) Let the person A, B, C and D



$$\text{Total earn} = 1200$$

with the help of fourth person D, (D work only 3 days) then

$$D \text{ earn} = \frac{1200}{16} \times 3 = \text{Rs. } 225$$

83. (d) Skilled : Half : Unskilled skilled

$$\begin{array}{ccc} \text{Each} & \frac{1}{3} & : & \frac{1}{4} & : & \frac{1}{6} \\ \text{day work} & 4 & : & 3 & : & 2 \end{array}$$

$$\text{days} \rightarrow 7 : 8 : 10$$

$$\text{work} \rightarrow 28 : 24 : 20$$

Skilled labour's share

$$= \frac{28}{72} \times 369 = 143.50$$

84. (d) Earning of first hrs.

$$= \frac{2000}{50} = 40 \text{ Rs.}$$

Additional 5 Hrs.

$$= 40 \times \frac{3}{2} \times 5 = \text{Rs. } 300$$

$$\therefore \text{Additional hrs.} = 5 \text{ hrs.}$$

85. (a) Let x be the number of men in begining

$$x \times 30 = (x + 5)(30 - 10)$$

$$30x = 20x + 100$$

$$x = 10$$

86. (c) 12 Men $\times$ 12 days

$$= 144 \text{ units}$$

$$12 \text{ Men} \times 6 \text{ days} = 72 \text{ units}$$

$$(12 - 6 = 6) \text{ Men complete the}$$

$$\text{work} = \frac{72}{6} = 12 \text{ days.}$$

87. Work 10 by 60 men in 200 days

$$= \frac{200}{250} = \frac{4}{5}$$

$$\text{remaining work} = 1 - \frac{4}{5} = \frac{1}{5}$$

$$\frac{MDH}{W_1} = \frac{MDH}{W_2}$$

$$\frac{60 \times 200}{\frac{4}{5}} = \frac{40 \times x}{\frac{1}{5}}$$

$$\Rightarrow x = 75$$

$$\text{So, men required} = 75 - 60 = 15$$

88. (c) $\frac{25 \text{ men} \times 24 \text{ days}}{\frac{1}{3}}$

$$= \frac{(25 + x)12}{\frac{2}{3}}$$

$$25 + x = 100, x = 75 \text{ days}$$

89. (a) 2M $\rightarrow x$ days

$$yW \rightarrow 3 \text{ days}$$

By M.D.H

$$2M \times x = 3 \times yW$$

$$\frac{M}{W} = \frac{3y}{2x}$$

$$3y : 2x$$

90. (b)

$$\begin{array}{l} P + Q \rightarrow 6 \text{ days} \quad 10 \\ Q + R \rightarrow \frac{60}{7} \text{ days} \quad 7 \end{array} \quad \begin{array}{l} 60 \\ (T.W.) \end{array}$$

Work done by Q + R in 6 days

$$= 42 \text{ Units}$$

∴ Remaining work = 18 Units

$$[60 - 42 = 18]$$

P work for 3 days

∴ Remaining work done By P then

$$3 \text{ days} \rightarrow 18 \text{ Units}$$

$$1 \text{ day} \rightarrow 6 \text{ Units}$$

then,

$$P + Q = 10, Q + R = 7$$

$$6 + Q = 10, 4 + R = 7$$

$$Q = 4 \text{ Units}, R = 3 \text{ Units}$$

Total work = 60 Units

$$\text{By P} \rightarrow \frac{60}{6} = 10 \text{ Days,}$$

$$\text{By R} \rightarrow \frac{60}{3} = 20 \text{ Days}$$

then Difference of days in working of R and P is

$$20 - 10 = 10 \text{ Days}$$

91. (b) Let 150 workers complete the work in x days.

$$150 \times x = 150 + 146 + \dots (x + 8) \text{ terms.}$$

On putting $x = 17$

$$\text{LHS} = 150 \times 17 = 2550$$

$$\text{RHS} = 150 + 146 + \dots 25 \text{ terms}$$

$$a = 150, d = -4, x = 25$$

$$S = \frac{x}{2} [2a + (x-1)d]$$

$$= \frac{25}{2} (2 \times 150 + 24 (-4))$$

$$= \frac{25}{2} (300 - 96)$$

$$= \frac{25 \times 204}{2} = 2550$$

It's better to solve by options.

92. (b) (6 Men + 8 Boy) 10

$$= (26 \text{ Men} + 48 \text{ Boys}) 2$$

$$\Rightarrow 60 M + 80 B = 52 M + 96 B$$

$$\Rightarrow 8 M = 16 B$$

efficiency

$$\frac{M}{B} = \frac{16}{8} = \frac{2}{1}$$

efficiency

According to the question,

$$(6 M + 8 B) \times 10$$

$$= (15 M + 20 B) \times x$$

$$(6 \times 2 + 8 \times 1) 10$$

$$= (15 \times 2 + 20 \times 1) x$$

$$\Rightarrow 20 \times 10 = 50 \times x$$

$$x = 4 \text{ days.}$$

93. (b) $5M \times 6 = 10W \times 5$

$$\frac{M}{W} = \frac{50}{30} = \frac{5}{3}$$

$$5 \text{ Women} + 3 \text{ Men}$$

$$= 5 \times 3 + 3 \times 5 = 30 \text{ units}$$

$$5M \times 6 = 30 \times x$$

$$\Rightarrow 5 \times 5 \times 6 = 30 \times x$$

$$x = 5 \text{ days.}$$

94. (c) $(4M + 6W) \times 8 = (3M + 7W) 10$

$$\Rightarrow 32M + 48W = 30M + 70W$$

$$\Rightarrow 2M = 22W$$

$$\frac{M}{W} = \frac{11}{1}$$

According to the question,

$$(4M + 6W) 8 = 10W \times x$$

$$\Rightarrow (4 \times 11 + 6 \times 1) 8 = 10 \times 1 \times x$$

$$\Rightarrow 50 \times 8 = 10 \times 1 \times x$$

$$\Rightarrow x = 40 \text{ days}$$

95. (b)

$$10 \text{ Men} = 20 \text{ Women} = 40 \text{ children}$$

$$\begin{array}{l} \text{Efficiency} \rightarrow 4 \quad 2 \quad 1 \\ \quad \quad \quad \quad \quad 40 \end{array}$$

According to the question,

$$\Rightarrow \frac{1}{2} \times 10M \times 7 = (5M + 5W + 5C)$$

$$\Rightarrow \frac{1}{2} \times 10 \times 4 \times 7$$

$$= (5 \times 4 + 5 \times 2 + 5 \times 1)x$$

$$x \times 35 = 20 \times 7$$

$$x = 4 \text{ months.}$$

96. (c) $40 \text{ Men} = 60 \text{ Women} = 80 \text{ Children}$

$$\begin{array}{l} \quad \quad \quad 4 \\ \swarrow \quad \downarrow \quad \searrow \\ 6 \quad \quad \quad 3 \end{array}$$

$$\text{LCM} = 240$$

According to the question,

$$\frac{1}{2} \times 40 \text{ men} \times 6 \text{ month}$$

$$= (10M + 10W + 10C) \times x$$

$$\Rightarrow 20 \times 6 \times 6$$

$$= (10 \times 6 + 10 \times 4 + 10 \times 3)x$$

$$3 \times 240 = 130 x$$

$$x = \frac{72}{13} = 5 \frac{7}{13} \text{ months}$$

97. (b) $3 \text{ Men} = 7 \text{ Women}$

$$\begin{array}{l} \quad \quad \quad 21 \\ \swarrow \quad \downarrow \quad \searrow \\ 7 \quad \quad \quad 3 \end{array}$$

According to the question,

$$3M \times 32 = (7M + 5W) \times x$$

$$\Rightarrow 3 \times 7 \times 32 = (7 \times 7 + 5 \times 3)x$$

$$x = \frac{21}{2} \text{ days}$$

$$\text{Twice of work done} = \frac{21}{2} \times 2$$

$$= 21 \text{ days.}$$

98. (c) A can cultivate $\frac{2}{5}$ land in 6 days.

∴ Total land cultivated by A

$$= 6 \times \frac{5}{2} = 15 \text{ days}$$

B can cultivate $\frac{1}{3}$ rd land in 10 days

∴ Total land cultivated by B

$$= 10 \times 3 = 30 \text{ days}$$

$$A \rightarrow 15 \text{ days.}$$

$$\begin{array}{l} \quad \quad \quad 2 \\ \swarrow \quad \downarrow \quad \searrow \\ 30 \end{array}$$

$$B \rightarrow 30 \text{ days.}$$

$$A \text{ and B} = \frac{30}{3} \times \frac{4}{5}$$

$$= 8 \text{ days.}$$

99. (a) A, B and C together earning =
 $A + C = \text{Rs. } 188$
 $B + C = \text{Rs. } 152$
 $A + B + 2C = 188 + 152 = 340$
 C's daily earning = $340 - 300$
 = Rs. 40

100. (b) $A + B \text{ work} = \frac{19}{23}$

C's work = $1 - \frac{19}{23} = \frac{4}{23}$

B's work = $\frac{8}{23} - \frac{4}{23} = \frac{4}{23}$

A's work = $\frac{19}{23} - \frac{4}{23} = \frac{15}{23}$

A's amount $529 \times \frac{15}{23} = \text{Rs. } 345$

101. (b) $\begin{array}{l} \text{Kim} \rightarrow 3 \\ \text{David} \rightarrow 2 \end{array} \begin{array}{l} 2 \\ 3 \end{array} \rightarrow 6$

Total efficiency of one day
 = $2 + 3 = 5$

Share of kim = $\frac{2}{5} \times 150 = \text{Rs. } 60$

102. (d) A's $\frac{1}{4}$ work = 3 days

A's whole work = $3 \times 4 = 12$ days

B's $\frac{1}{6}$ work = 4 days

B's whole work = $4 \times 6 = 24$ days

$\begin{array}{l} A \rightarrow 12 \\ B \rightarrow 24 \end{array} \begin{array}{l} 2 \\ 1 \end{array} \rightarrow 24$

A's amount = $180 \times \frac{2}{3} = \text{Rs. } 120$

103. (b) $\begin{array}{l} A \rightarrow 6 \\ B \rightarrow 8 \\ A + B + C \rightarrow 3 \end{array} \begin{array}{l} 4 \\ 3 \\ 8 \end{array} \rightarrow 24$

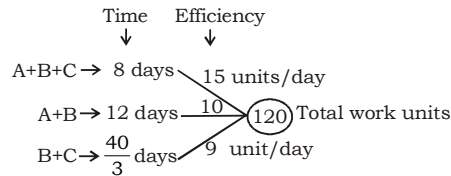
C's efficiency = $8 - 4 - 3 = 1$

C's amount = $3200 \times \frac{1}{24} = \frac{400}{3}$

C's amount for 3 days

= $\frac{400}{3} \times 3 = \text{Rs. } 400$

104. (a)



Efficiency of A = $15 - 9 = 6$ units/day

Efficiency of B = $10 - 6 = 4$ units/day

Efficiency of C = $9 - 4 = 5$ units/day

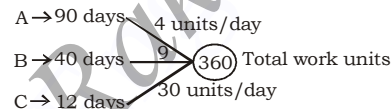
Share of A = $\frac{6}{15} \times 6750 = 2700$ Rs.

Share of B = $\frac{4}{15} \times 6750 = 1800$ Rs.

Share of C = $\frac{5}{15} \times 6750 = 2250$ Rs.

Hence option (a) is correct.

105. (a)



Work of three days by, A, B and C = $4 + 9 + 30 = 43$ units

Work of 3×8 days by A, B and C = $8 \times 43 = 344$ units

So, on the 25th day A will work = 4 units

on the 26th day B will work = 9 units

Total work in 26 days = 357 units

Now the remaining 3 units

done by C = $\frac{3}{30}$ days = $\frac{1}{10}$ days

No. of Units done by :

A $\rightarrow 36$ units

B $\rightarrow 81$ units

C $\rightarrow 243$ units

So, their share:-

A = $\frac{36}{360} \times 3600 = \text{Rs. } 360$

B = $\frac{81}{360} \times 3600 = \text{Rs. } 810$

C = $\frac{243}{360} \times 3600 = \text{Rs. } 2430$

106. (c) Total time taken by all
 = 10 days

according to the question,

Initial 2 days + Last 8 days

(B+C+D)=40% work C+D=60% work

Efficiency of (B+C+D) = 20%

Efficiency of (C+D) = $\frac{60}{8} = 7.5\%$

From question conditon

$\begin{array}{ccc} & C : & D \\ \text{Days} & \rightarrow & 4 : 5 \end{array}$

Efficiency $\rightarrow 5 : 4$

Efficiency of C = $\frac{7.5}{9} \times 5 = \frac{25}{6}\%$

Efficiency of D = $\frac{7.5}{9} \times 4 = \frac{10}{3}\%$

Efficiency of B = $(20 - 7.5) = 12.5\%$

So D is the least efficient.

Now share of work done by David (D)

= $\frac{10}{3} \times 10 \times \frac{3000}{100} = 1000$ Rs.

107. (b) According to the pattern of the company :

$1 + 2 + 3 + 4 + 5 + \dots 24$

sum = $\frac{n(n+1)}{2}$ [for arithmetic progression]

sum = $\frac{24 \times 25}{2} = 300$

Note:- The person who started the work on the first day works for 24 days. Hence, his share will be maximum. Then share

= $\frac{5000}{300} \times 24 = \text{Rs. } 400$



11

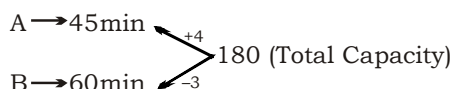
PIPE AND CISTERN

Examples

1. A tank is fitted with two taps. The first tap can fill tank completely in 45 minutes and the second tap can empty the full tank in one hour. If both the taps are opened alternately for one minute, then in how many hours the empty tank will be filled completely?

- (a) 2 hours 55 minutes
(b) 3 hours 40 minutes
(c) 4 hours 48 minutes
(d) 5 hours 53 minutes

Sol. (d)



Efficiency of A and B in 2 minutes = $4 - 3 = 1$ unit.

Time	work done
2 minutes	1 unit

$\downarrow \times 176$ $\downarrow \times 176$

352 minutes 176 units

Remaining part = $180 - 176 = 4$ units

Time taken by A to fill remaining

part = $\frac{4}{4} = 1$ minute

So, total time taken

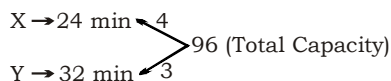
= $352 + 1 = 353$ minutes

5 hours 53 minutes

2. Two pipes X and Y can fill a cistern in 24 minutes and 32 minutes respectively. If both the pipes are opened together, then after how much time (in minutes) should Y be closed so that the tank is full in 18 minutes?

- (a) 10 (b) 8
(c) 6 (d) 5

- Sol. (b) According to the question



According to the question,

X would be open till the end.

So, tank filled by X in 18 minutes = $18 \times 4 = 72$ units

Remaining part of tank

= $96 - 72 = 24$ units

- $\therefore$ Pipe Y fill the remaining part in

= $\frac{24}{3} = 8$ min

So,

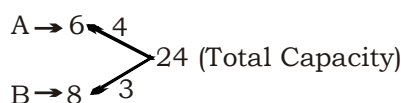
after 8 minutes it must have closed

3. Pipe A can fill an empty tank in 6 hours and pipe B in 8 hours. If both the pipes open Alternately for 2 hours. In how much time B will take to fill the remaining tank?

- (a) $7\frac{1}{2}$ hours (b) $2\frac{2}{5}$ hours

- (c) $2\frac{2}{5}$ hours (d) $3\frac{1}{3}$ hours

- Sol. (d) According to the question



efficiency of A and B = $4 + 3$

= 7 units/hour

tank filled by A and B in two hours = $7 \times 2 = 14$ units

Remaining capacity of tank

= $24 - 14 = 10$ units

- $\therefore$ time taken by B to fill the

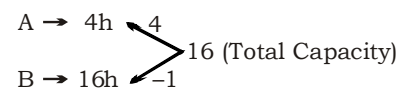
Remaining part = $\frac{10}{3} = 3\frac{1}{3}$ hours.

4. A tank has two pipes. The first pipe can fill it in 4 hours and the second can empty it in 16 hours. If two pipes be opened together at a time then the tank will be filled in

- (a) $5\frac{1}{2}$ hours (b) 6 hours

- (c) 10 hours (d) $5\frac{1}{3}$ hours

- Sol. (d) According to the Question



efficiency of A and B = $4 - 1 = 3$ units/hour

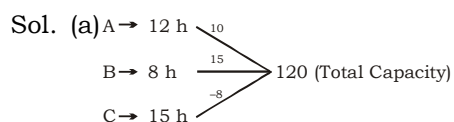
- $\therefore$ time taken by A & B to fill the

full tank = $\frac{16}{3} = 5\frac{1}{3}$ h.

5. Pipe A can fill the tank in 12 hours and pipe B can fill the tank in 8 hours and third pipe C empties tank in 15 hours. If all pipes are opened together then after 5 hours what portion of the tank will be filled.

- (a) $\frac{17}{24}$ (b) $\frac{24}{17}$

- (c) $\frac{17}{120}$ (d) $\frac{1}{3}$



Efficiency of A, B and C

= $10 + 15 - 8 = 17$ units/hour



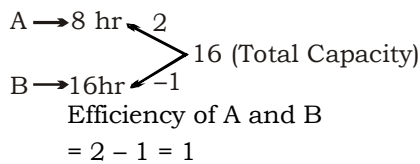
Tank filled by A, B and C in 5 hours = $17 \times 5 = 85$ units

$$\therefore \text{Required portion} = \frac{85}{120} = \frac{17}{24}$$

6. A tap can fill a cistern in 8 hours and another can empty it in 16 hours. If both the taps are opened simultaneously the time (in hours) to fill the tank is:

- (a) 8 (b) 10
(c) 16 (d) 24

Sol. (c) According to the question

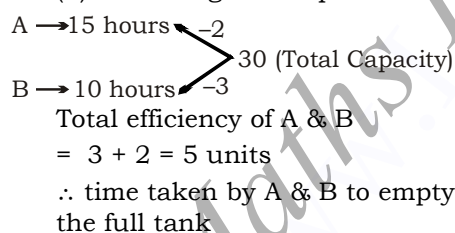


$$\therefore \text{Total time taken} = \frac{16}{1} = 16 \text{ hours.}$$

7. A pipe can empty a tank in 15 hrs and another pipe can empty it in 10 hours. If both the pipes are opened simultaneously. Find the time in which a full tank is emptied.

- (a) 8 hrs (b) 6 hrs.
(c) 4 hrs. (d) 5 hrs.

Sol. (b) According to the question

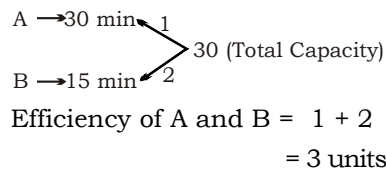


$$= \frac{30}{5} = 6 \text{ hours.}$$

8. Two pipes A and B can fill a tank in 30 minutes and 15 minutes respectively. If both the pipe are opened simultaneously, in how much time will be taken to fill the tank?

- (a) 10 minutes (b) 12 minutes
(c) 8 minutes (d) 9 minutes

Sol. (a) According to the question



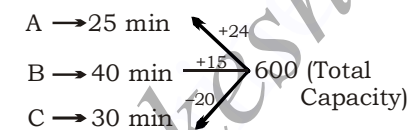
$\therefore$ Total time taken by A & B to

$$\text{fill the tank} = \frac{30}{3} = 10 \text{ min.}$$

9. Tap A can fill a water tank in 25 minutes, tap B can fill the same tank in 40 minutes and tap C can empty in 30 minutes. In how much time they completely filled up or emptied the tank?

- (a) $3\frac{2}{13}$ (b) $15\frac{5}{13}$
(c) $8\frac{2}{13}$ (d) $31\frac{11}{19}$

Sol. (d) According to the question



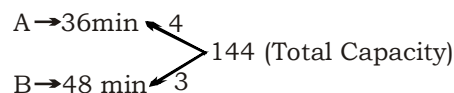
$\therefore$ Total time taken fill the tank

$$= \frac{600}{19} = 31\frac{11}{19} \text{ min.}$$

10. Two pipes A and B fill a tank in 36 minutes and 48 minutes respectively. If both the pipes are opened simultaneously, after how much time should B be closed so that the tank is full in 27 minutes?

- (a) 10 min (b) 12 min
(c) 14 min (d) 16 min

Sol. (b) According to the question



According to the question,
A would be opened till the end.
So, tank filled by A in 27 minutes = $4 \times 27 = 108$ units
Remaining capacity of tank
= $144 - 108 = 36$ units

$\therefore$ Pipe B fill the remaining tank in

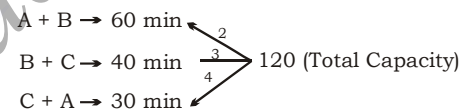
$$= \frac{36}{3} = 12 \text{ minutes}$$

So,
after 12 minutes it must have closed.

11. Three pipes A, B and C are connected to a tank, A and B together can fill the tank in 60 minutes, B and C together in 40 minutes and C and A together in 30 minutes. In how much time will each pipe fill the tank

- (a) 80 min, 240 min, 48 min
(b) 40 min, 120 min, 24 min
(c) 60 min, 250 min, 64 min
(d) 65 min, 240 min, 64 min

Sol. (a) According to the question



Efficiency of A, B and C

$$= \frac{4 + 3 + 2}{2} = 4.5 \text{ units}$$

A's efficiency = 1.5 units

B's efficiency = .5 unit

C's efficiency = 2.5 units

$$\text{Time taken by A} = \frac{120}{1.5} = 80 \text{ min}$$

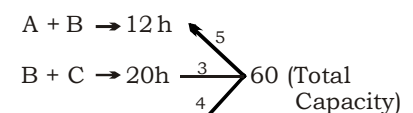
$$\text{Time taken by B} = \frac{120}{.5} = 240 \text{ min}$$

$$\text{Time taken by C} = \frac{120}{2.5} = 48 \text{ min}$$

12. Three pipes A, B and C are connected to a tank. A and B together can fill the tank in 12 hrs. B and C together in 20 hrs and C and A together in 15hrs. In how much time will be fill the tank separately?

- (a) 10 hrs, 15 hrs, 30 hrs
(b) 20 hrs, 15 hrs, 60 hrs.
(c) 20 hrs, 30 hrs, 60 hrs.
(d) 20 hrs, 30 hrs, 45 hrs.

Sol. (a) According to the question



Efficiency of A, B and C



$$= \frac{5+3+4}{2} = 6 \text{ units}$$

A's efficiency = 3 units

B's efficiency = 2 units

C's efficiency = 1 unit

$$\text{Time taken by A} = \frac{60}{3} = 20 \text{ hr}$$

$$\text{Time taken by B} = \frac{60}{2} = 30 \text{ hr}$$

$$\text{Time taken by C} = \frac{60}{1} = 60 \text{ hr}$$

13. Two pipes can separately fill a tank in 10 hrs and 15 hrs respectively. Both the pipes are opened to fill the tank but when the tank is $\frac{1}{6}$ th full a leak develops in the tank through which $\frac{1}{6}$ th of the water supplied by both the pipes leak out. What is the total time taken to fill the tank?

- (a) 7 hrs (b) 5 hrs
(c) 6 hrs. (d) 9 hrs

Sol.

$$\begin{array}{l} \text{A} \rightarrow 10 \text{ hr} \quad 3 \\ \text{B} \rightarrow 15 \text{ hr} \quad 2 \end{array} \rightarrow 30 \text{ (Total Capacity)}$$

Efficiency of A and B = 3 + 2 = 5 units/hour

Time taken by A and B to fill the $\frac{1}{6}$ th part of total capacity

$$= \frac{30 \times \frac{1}{6}}{5} = \frac{5}{5} = 1 \text{ hours}$$

Remaining part = 30 - 5 = 25 units

Efficiency of both the pipes when $\frac{1}{6}$ th of total efficiency of leak out

$$= 5 \times \left(1 - \frac{1}{6}\right) = \frac{25}{6} \text{ units/hour}$$

∴ time taken by the both pipes

$$\text{after leaking} = \frac{25}{\frac{25}{6}} = 6 \text{ hours}$$

Hence, total time taken = 6 + 1 = 7 hours.

14. Two Pipes A and B can separately fill a tank in 2 hours and 3 hours respectively. If both the pipes are opened simultaneously in the empty tank, then the tank will be filled in
- (a) 1 hours 12 minutes
(b) 2 hours 30 minutes
(c) 1 hours 15 minutes
(d) 1 hours 20 minutes

Sol.

$$\begin{array}{l} \text{A} \rightarrow 2 \text{ hr} \quad 3 \\ \text{B} \rightarrow 3 \text{ hr} \quad 2 \end{array} \rightarrow 6 \text{ (Total Capacity)}$$

(A+B) fill the tank in

$$= \frac{\text{T.C}}{\text{Efficiency of (A+B)}} = \frac{6}{3+2} = 1\frac{1}{5} = 1 \text{ hours } 12 \text{ min}$$

15. A tap drops at a rate of one drop/sec 600 drops make 100ml. The number of litres wasted in 300 days is:
- (a) 4320000 (b) 432000
(c) 43200 (d) 4320

Sol. (d) 1 sec — 1 drop

No of second in 300 days.

$$(24_{\text{min}} \times 60_{\text{min}} \times 60_{\text{sec}}) \times 300 \text{ days}$$

$$\begin{aligned} \text{No of litres wasted} &= 100 \times \frac{24 \times 60 \times 60 \times 300}{600} \times \frac{1}{1000} \\ &= \frac{4320000}{1000} = 4320 \text{ litres} \end{aligned}$$

16. Having the same capacity 9 taps fill up a water tank in 20 minutes. How many taps of the same capacity are required to fill up the same water tank in 15 minutes?

- (a) 10 (b) 12
(c) 15 (d) 18

$$\text{Sol. (b)} \left[\frac{m_1 \times h_1 \times t_1}{w_1} = \frac{m_2 \times h_2 \times t_2}{w_2} \right]$$

$$9_{\text{taps}} \times 20_{\text{mins}} = T_{\text{taps}} \times 15_{\text{mins}}$$

$$T = 12 \text{ Taps}$$

17. A cistern is provided with two pipes A and B. A can fill it in 20 minutes and B can empty it in 30 minutes for one minute each. How soon will the cistern be filled?

- (a) 121 minutes
(b) 110 minutes
(c) 115 minutes
(d) 120 minutes

Sol. (c)

$$\begin{array}{l} \text{A} \rightarrow 20 \text{ min} \quad +3 \\ \text{B} \rightarrow 30 \text{ min} \quad -2 \end{array} \rightarrow 60 \text{ (Total Capacity)}$$

Efficiency of A and B in 2 minutes = 3 - 2 = 1 unit

Time work
2 minutes 1 unit

$$\downarrow \times 57 \quad \downarrow \times 57$$

114 minutes 57 units

Remaining part of the tank

$$= 60 - 57 = 3 \text{ units}$$

time taken by A to fill the Remain-

$$\text{ing tank} = \frac{3}{3} = 1 \text{ minute}$$

Hence, total time taken by both the pipes = 114 + 1

$$= 115 \text{ minutes}$$

18. Two pipes A and B can fill a tank with water in 30 minutes and 45 minutes respectively. The third pipe C can empty the tank in 36 minutes. First A and B are opened. After 12 minutes C is opened. Total time (in minutes) in which the tank will be filled up is:

- (a) 12 (b) 24
(c) 30 (d) 36

Sol. (b)

$$\begin{array}{l} 180 \\ +6 \quad +4 \quad +5 \\ \text{A} \quad \text{B} \quad \text{C} \\ 30\text{min} \quad 45\text{min} \quad 36\text{min} \end{array}$$

tank Filled by (A + B) in 12 min = 12 × (6 + 4)

$$= 12 \times 10 = 120 \text{ units}$$

Remaining capacity of tank

$$= 180 - 120 = 60 \text{ units}$$

After 12 min, emptied pipe C is also opened



So, total capacity of A, B and C
 $= 6 + 4 - 5 = 5$ units

Time taken by A, B and C with
 efficiency 5 units to fill the

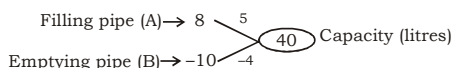
remaining part $= \frac{60}{5} = 12$ min.

Therefore, total time which the
 tank will be filled up
 $= 12 + 12 = 24$ minutes.

19. There are three filling pipes each capable of filling a cistern alone in 8 minutes and 2 emptying pipes each capable of emptying the cistern alone in 10 minutes. All pipes are opened together and as a result, tank fills 7 litres of water per minute. Find the capacity of the tank.

- (a) 20 litres (b) 25 litres
 (c) 40 litres (d) 30 litres

Sol. (c)



Efficiency of the three filling
 pipes $= 5 \times 3 = 15$ litres/min

Efficiency of the two emptying
 pipes $= 4 \times 2 = 8$ litres/min

Net part of water filled

$= (15 - 8) = 7$ litres/min

According to the question :-

Capacity of the tank

$= \frac{7}{1} \times 40 = 40$ litres

20. In what time would a cistern be filled by three pipes whose

diameters are 1 cm, $1\frac{1}{3}$ cm, 2

cm running parallel, when the largest one alone fills it in 61 minutes. The amount of water flowing in through each pipe being proportional to the square of its diameter?

- (a) 20 min (b) 36 min
 (c) 18 min (d) 72 min

Sol. (b) **Note** : In such type of questions to save your valuable time follow the given below method.

Required time

$$= \frac{61 \times (2)^2}{(1)^2 + \left(\frac{4}{3}\right)^2 + (2)^2}$$

$$= \frac{61 \times 4}{1 + \frac{16}{9} + 4} = \frac{61 \times 4 \times 9}{(9 + 16 + 36)}$$

= 36 minutes

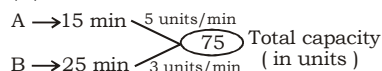
21. A cistern can be filled by two pipes filling separately in 15 and 25 minutes respectively. Both pipes are opened together for a certain time but being clogged,

only $\frac{5}{6}$ of full quantity of water flows through the former and only $\frac{5}{8}$ through the latter pipe.

The obstruction, however being suddenly removed, the cistern is filled in 5 minutes from that moment. How long was it before the overflow began?

- (a) $\frac{161}{29}$ min. (b) $\frac{168}{29}$ min.
 (c) $\frac{148}{29}$ min. (d) None of these

Sol. (b)



(Let both the pipes remain clogged for x minutes) and hence full flow began after x minutes only.

$\therefore$ Part of cistern filled in x minutes + part of cistern filled in 5 minutes = Cistern filled

$$\left(5 \times \frac{5}{6}x + 3 \times \frac{5}{8}x\right) + 5(5 + 3)$$

$$= 75$$

$$\Rightarrow \frac{25x}{6} + \frac{15x}{8} + 40 = 75$$

$$\Rightarrow \frac{100x + 45x}{24} = 35$$

$$\Rightarrow 145x = 840$$

$$x = \frac{840}{145} = \frac{168}{29} \text{ minutes}$$

22. A tank has three pipes. The first pipe can fill 50% of the tank in 1 hour and second pipe can fill

$\frac{2}{3}$ part in 2 hour. The third pipe is for making the tank empty. When all three pipes are opened,

$\frac{7}{12}$ part of the tank is filled in 1

hours. How much time will the third pipe take to empty the completely filled tank?

- (a) 3 hours (b) 4 hours
 (c) 5 hours (d) 6 hours

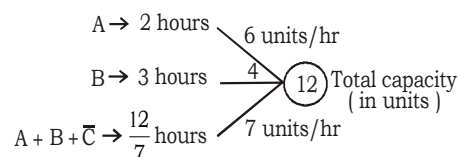
Sol. (b) Required time for pipe A to fill the tank = 2 hours

Required time for pipe B to fill the tank = 3 hours

Let $\bar{C}$ is the empty pipe.

Required time for $(A+B+\bar{C})$

$$= \frac{12}{7} \text{ hours}$$



Efficiency of waste pipe ($\bar{C}$)

$= (6 + 4) - 7 = 3$ units/hr

Required time for pipe ($\bar{C}$) to

empty the tank $= \frac{12}{3}$

= 4 hours

23. A bath can be filled by the cold water pipe in 5 hours and by hot

water pipe in $7\frac{1}{2}$ hours. A per-

son leaves bathroom after turning on both pipes simultaneously and returns at the moment when the bath should have been full. Finding, however the waste pipe has been left open, he

now closes it. In 2 hours more the bath is full. In what time should the waste pipe empty it:

(a) 6 hours (b) 4 hours

(c) 3 hours (d) $4\frac{1}{2}$ hours

Sol. (d) Let the cold water and hot water pipes are A and B respectively.

A $\rightarrow$ 5 hours $\xrightarrow{3 \text{ units/hr}}$
 B $\rightarrow \frac{15}{2}$ hours $\xrightarrow{2 \text{ units/hr}}$ 15 Total capacity
 (in units)

Required time to fill the bath

$$= \frac{15}{(3+2)} = 3 \text{ hours}$$

According to the question :-

Water filled by the pipe (A + B) in 2 hours

= Water wasted by waste pipe ($\bar{C}$) in 3 hours

$\therefore$

Efficiency of waste pipe ($\bar{C}$)

$$= \frac{2 \times (3+2)}{3} = \frac{10}{3} \text{ units/hr}$$

Required time for ($\bar{C}$) to empty the bath

$$= \frac{15}{\frac{10}{3}} \times 3 = \frac{9}{2} = 4\frac{1}{2} \text{ hours}$$





Exercise

1. Two pipes A and B can fill a tank in 20 minutes and 30 minutes respectively. If both pipes are opened together, the time taken to fill the tank is:
 - (a) 50 min. (b) 12 min.
 - (c) 25 min. (d) 15 min.
2. Two pipes A and B can separately fill a cistern in 60 minutes and 75 minutes respectively. There is a third pipe in the bottom of the cistern to empty it. If all the three pipes are simultaneously opened then the cistern is full in 50 minutes. In how much time the third pipe alone can empty the cistern?
 - (a) 110 min. (b) 100 min.
 - (c) 120 min. (d) 90 min.
3. A cistern is provided with two pipes A and B. A can fill it in 20 minutes and B can empty it in 30 minutes. If A and B be kept open alternately for one minute each, how soon will the cistern be filled?
 - (a) 121 min. (b) 110 min.
 - (c) 115 min. (d) 120 min.
4. If $\frac{1}{3}$ rd of tank holds 80 litres of water, then the quantity of water that $\frac{1}{2}$ tank holds is :
 - (a) 240 litres (b) 120 litres
 - (c) $\frac{80}{3}$ litres (d) 100 litres
5. A tap can fill a tank in 6 hours. After half the tank is filled three more similar taps are opened. What is the total time taken to fill the tank completely?
 - (a) 4 hours
 - (b) 4 hours 15 minutes
 - (c) 3 hours 15 minutes
 - (d) 3 hours 45 minutes
6. Two pipes A and B can fill a cistern in $37\frac{1}{2}$ minutes and 45 minutes respectively. Both the pipes are opened. The cistern will be filled just in half an hour if the pipe B is turned off after:
 - (a) 15 minutes (b) 10 minutes
 - (c) 5 minutes (d) 9 minutes
7. A tank can be filled with water by two pipes A and B together in 36 minutes. If the pipe B was stopped after 30 minutes the tank is filled in 40 minutes. The pipe B can alone fill the tank in
 - (a) 45 minutes (b) 60 minutes
 - (c) 75 minutes (d) 90 minutes
8. Two taps A and B can fill a tank in 48 min. and 36 min. If both the taps are opened together. After how much time tap A is closed so that the whole tank will be filled in 25 min. 30 sec.
 - (a) 14 min
 - (b) 18 min
 - (c) 14 min 30 sec
 - (d) 15 min 30 sec
9. Taps A and B can fill a tank in 20 hours and 30 hours respectively. Both the pipes are opened to fill the tank but when the tank is $\frac{1}{3}$ rd full, a leak develops in the bottom of the tank, through which $\frac{1}{3}$ rd of the water supply by both the pipes leaks out. Then calculate in how much time the tank will be full ?
 - (a) 16 hours (b) 12 hours
 - (c) 18 hours (d) None of these
10. If taps A and B can fill a tank in 15 hours and 20 hours respectively. Both the taps are opened together when the tank is $\frac{1}{4}$ th full, a leak develops in the bottom of the tank. Through which $\frac{1}{5}$ th of water supply by both the pipes leaks out. Then calculate in how many hours the tank will be full ?
 - (a) $10\frac{5}{28}$ days (b) $11\frac{5}{28}$ days
 - (c) $1\frac{5}{28}$ days (d) None of these
11. In a tank four taps of equal efficiency are fitted on equal intervals. The first pipe is at the base of the tank. And the 4th pipe is at $\frac{3}{4}$ th of height of the tank. Then calculate in how much time the whole tank will empty. If the first pipe can empty the tank in 12 hours.
 - (a) 6 hours 15 min.
 - (b) 7 hours 15 min.
 - (c) 8 hours 20 min.
 - (d) None of these
12. Two taps A and B can fill a tank in 30 min and 36 min respectively. Both taps are opened together but due to some problem they work $\frac{5}{6}$ and $\frac{9}{10}$ of their efficiencies, after some time the problem was removed and now the tank will fill in $16\frac{1}{2}$ min. Then after how much time the problem was removed.
 - (a) 1 minutes (b) 2 minutes
 - (c) 3 minutes (d) $1\frac{1}{2}$ minutes
13. Two taps A and B can fill a tank in 10 hours and 12 hours respectively. There is an outlet tap C. If all the taps are opened together the tank will fill in 30 hours. In how many hours tap C can alone empty the tank.



- (a) $\frac{60}{7}$ hours (b) $\frac{60}{9}$ hours
(c) $\frac{60}{11}$ hours (d) $\frac{60}{13}$ hours
14. A leak in the bottom of a tank can empty it in 6 hours. A tap fills the tank at the rate of 4 litres/min is turn on. If both the taps are opened then the tank will empty in 8 hours. Find the capacity of the tank?
(a) 2400 litres (b) 5780 litres
(c) 5760 litres (d) None of these
15. A leak in the bottom of a tank can empty it in 12 hours. A tap which can fill 20 litres of water per minute is turned on. Both the taps are opened now, then the tank is emptied in 20 hours. Find the capacity of the tank ?
(a) 36000 litres (b) 3600 litres
(c) 360 litres (d) None of these
16. 8 taps are fitted in a tank some are inlet taps and rests are outlet tap. Each inlet tap can fill the tank in 12 hours and each outlet tap can empty it in 36 hours. Then calculate the number of inlet water taps if the whole tank filled in 3 hours.
(a) 5 (b) 3
(c) 4 (d) None of these
17. 9 taps are fitted in a tank some are inlet taps and some are outlet taps. Each inlet tap can fill the tank in 9 hours and each outlet tap can empty the tank in 9 hours. If all the taps are open then tank will be full in 9 hours, then find the number of outlet taps.
(a) 4 (b) 5
(c) 3 (d) None of these
18. 12 taps are fitted in a tank some are inlet taps and some are outlet taps. Each inlet tap can fill the tank in 6 hours and each outlet tap can empty the tank in 12 hours. If all the taps are open together then the tank will be full in 4 hours. Then find the number of inlet taps.
(a) 5 (b) 4
(c) 6 (d) None of these
19. Tap A and B can fill a tank in 10 hours and 20 hours respectively. Tap C can empty it in 12 hours. If all the taps are open alternatively for 1 hour each then the whole tank will be filled in how many hours. ?
(a) $40\frac{2}{3}$ hours
(b) $20\frac{1}{3}$ hours
(c) $8\frac{2}{3}$ hours
(d) None of these
20. Pipe A can fill a tank in 12 hours and pipe B can fill it in 15 hours, separately. A third pipe C can empty it in 20 hours. Initially pipe A was opened, after one hour pipe B was opened and then after 1 hour when pipe B was opened pipe C was also opened. In how many hours the tank will be full?
(a) $9\frac{2}{3}$ hours (b) $6\frac{2}{3}$ hours
(c) 10 hours (d) None of these
21. A tank has an inlet and outlet pipe. The inlet pipe fills the tank completely in 2 hours when the outlet pipe is plugged. The outlet pipe empties the tank completely in 6 hours when the inlet pipe is plugged.
If both pipes are opened simultaneously at a time when the tank was one-third filled, when will be the tank full thereafter?
(a) $\frac{3}{2}$ hours (b) $\frac{2}{3}$ hours
(c) 2 hours (d) $1\frac{2}{3}$ hours
22. An inlet pipe can fill a tank in 5 hours and an outlet pipe can empty the same tank in 36 hours, working individually. How many additional number of outlet pipes of the same capacity are required to be opened, so that the tank never overflows ?
(a) 3 (b) 6
(c) 8 (d) 7
23. In a public bathroom there are n taps 1, 2, 3,...n. Tap 1 and Tap 2 take equal time to fill the tank while tap 3 takes half the time taken by tap 2 and tap 4 takes half the time taken by tap 3. Similarly each next number of tap takes half the time taken by previous number of tap i.e., K^{th} tap takes half the time taken by $(K - 1)^{\text{th}}$ tap.
If the 8^{th} tap takes 80 hours to fill the tank the 10^{th} and the 12^{th} tap working together take how many hours to fill the tank?
(a) 2 hours (b) 4 hours
(c) 6 hours (d) None of these
24. Pipe A takes $\frac{3}{4}$ of the time required by pipe B to fill the empty tank individually. When an outlet pipe C is also opened simultaneously with pipe A and pipe B, it takes $\frac{3}{4}$ more time to fill the empty tank than it takes normally when only pipe A and pipe B are opened together. If it takes 33 hours to fill when all the three pipes are opened simultaneously, then in what time pipe C can empty the full tank operating alone ?
(a) 66 hours
(b) 50 hours
(c) 44 hours
(d) can't be determined
25. A tank is connected with 8 pipes. Some of them are inlet pipes and rest work as outlet pipes. Each of the inlet pipe can fill the tank in 8 hours, individually, while each of those that empty the tank i.e., outlet pipe, can empty it in 6 hours individually. If all the pipes are kept open when the tank is full, it will take exactly 6 hours for the tank to empty. How many of these are inlet pipes?



- (a) 2 (b) 4
(c) 5 (d) 6
26. A tank has two inlet pipes which can fill the empty tank in 12 hours and 15 hours working alone and one outlet pipe which can empty the full tank in 8 hours working alone. The inlet pipes are kept open for all the time but the outlet pipe was opened after 2 hours for one hour and then again closed for 2 hours then once again opened for one hour. This pattern of outlet pipe continued till the tank got completely filled. In how many hours the tank has been filled, working on the given pattern?
(a) 8 hours 24 min.
(b) 10 hours 15 min.
(c) 9 hours 10 min.
(d) 9 hours 6 min.
27. A, B, C are three pipes attached to a cistern. A and B can fill it in 20 and 30 minutes respectively, while C can empty it in 15 minutes. If A, B, C are kept open successively for 1 minute each, how soon will the cistern be filled?
(a) 167 min. (b) 160 min.
(c) 166 min. (d) 164 min.
28. A bath can be filled by the cold water pipe in 10 minutes and by the hot water pipe in 15 minutes. A person leaves the bathroom after turning on both the pipes simultaneously and returns at the moment when the bath will be full. Finding however, that the waste pipe has been open, he now closed it. In 4 minutes more the bath is full. In what time would the waste pipe empty it.
(a) 9 min. (b) 8 min.
(c) 12 min. (d) 6 min.
29. Pipe A takes 4 minutes more to fill the cistern than two pipes A and B opened together to fill it. Second pipe B takes 9 minutes more to fill cistern than two fill pipes A and B opened together to fill it. When will the cistern be full if both pipes are opened simultaneously.
(a) 4 minutes (b) 6 minutes
(c) 5 minutes (d) 7 minutes
30. Two pipes can fill a cistern in 30 and 15 hours respectively. The pipes are opened simultaneously and it is found that due to leakage in the bottom, 5 hours extra are taken for the cistern to be filled up. If the cistern is full, in what time would the leak empty it?
(a) 60 hours (b) 45 hours
(c) 35 hours (d) 30 hours
31. There are 12 filling pipes each capable of filling a cistern alone in 32 minutes and 8 emptying pipes each capable of emptying A cistern alone in 40 minutes. All pipes are opened together and as a result, tank was filled with 28 litres of water per minute. Find the capacity of the tank.
(a) 160 litres (b) 120 litres
(c) 100 litres (d) 80 litres
32. Three pipes A, B and C are connected to a tank. A and B together can fill a tank in 60 minutes, B and C together in 40 minutes and C and A together in 30 minutes. In how much time will each pipe fill the tank separately?
(a) 80 min, 240 min, 48 min
(b) 40 min, 120 min, 24 min
(c) 60 min, 250 min, 64 min
(d) 65 min, 240 min, 64 min
33. If two pipes function simultaneously, the reservoir is filled in 6 hours. One pipe fills the reservoir 5 hours faster than the other. How many hours does the faster pipe takes to fill the reservoir?
(a) 20 hours (b) 10 hours
(c) 15 hours (d) 12 hours
34. One filling pipe A is 5 times faster than second filling pipe B. If B can fill a cistern in 36 minutes, then find the time when the cistern will be full if both the fill pipes are opened together.
(a) 6 minutes (b) 8 minutes
(c) 4 minutes (d) 12 minutes
35. In what time would a cistern be filled by three pipes whose diameters are 1 cm, 2 cm, 4 cm, running together. When the largest alone fill it in $1\frac{1}{20}$ hours, the amount of water flowing in by each pipe being proportional to the square of its diameter.
(a) 38 minutes (b) 42 minutes
(c) 44 minutes (d) 48 minutes
36. Two pipes A and B can fill a cistern in 20 minutes and 25 minutes respectively. Both are opened together, but at the end of 5 minutes, B is turned off. How much time will the cistern takes to be filled?
(a) 16 minutes (b) 18 minutes
(c) 11 minutes (d) None of These
37. One fill pipe A takes $4\frac{1}{2}$ minutes more to fill the cistern than two fill pipes A and B opened together to fill it. Second fill pipe B takes 8 minutes more to fill the cistern than two fill pipes A and B opened together to fill it. When will the cistern be full if both the pipes are opened simultaneously.
(a) 8 min. (b) 6 min
(c) 11 min. (d) None of these
38. Two fill pipes A and B can fill a cistern in 18 and 24 minutes respectively. Both fill pipes are opened together, but 6 minutes before the cistern is full, one pipe A is closed. How much time will the cistern takes to be full.
(a) $12\frac{4}{7}$ min. (b) $12\frac{5}{7}$ min
(c) $13\frac{5}{7}$ min. (d) None of these



39. A cistern can be filled by two pipes filling separately in 12 and 16 minutes respectively. Both pipes are opened together for a certain time but being clogged, only $\frac{7}{8}$ of full quantity water flows through the former and only $\frac{5}{6}$ through the latter pipe. The obstructions, however being suddenly removed, the cistern is filled in 3 minutes from that moment. How long was it before the overflow began?

(a) $4\frac{1}{3}$ min. (b) $4\frac{1}{2}$ min.
(c) $3\frac{1}{2}$ min. (d) $8\frac{1}{3}$ min.

40. A cistern can be filled by one of the two pipes in 30 minutes and by the other in 36 minutes. Both pipes are opened together for a certain time but being particularly Clogged, only $\frac{5}{6}$ of the full quantity of water flows through the former and only $\frac{9}{10}$ through the latter. The obstructions, however, being suddenly removed, the cistern is filled in $15\frac{1}{2}$ minutes from that moment. How long was it before the overflow of water began?
- (a) 1 min. (b) 2 min.
(c) 5 min. (d) $1\frac{1}{2}$ min.

41. Three pipes A, B, and C are attached to a cistern. A can fill it in 10 minutes and B in 15 minutes. C is a waste pipe for emptying it. After opening both the pipes A and B, a man leaves the cistern and returns when the cistern should have been just full. Finding however, that the waste pipe has been left open,

he closes it and the cistern is now full in 2 minutes. In how much time the pipe C, if opened alone, empty the full cistern.

(a) 18 min. (b) 16 min.
(c) 12 min. (d) None of these

42. Three pipes A, B, and C are attached to a cistern. A can fill it in 20 minutes and B in 30 minutes. C is a waste pipe meant for emptying it. After opening both the pipes A and B, a man leaves the cistern and returns when the cistern should have been just full. Finding however, that the waste pipe has been left open, he closes it and the cistern now filled in 3 minutes. In how much time the pipe C, if opened alone, empty the full cistern?

(a) 18 min. (b) 16 min.
(c) 12 min. (d) None of these

43. Pipe A can fill a tank in 12 hours. Due to development of a hole in the bottom of the tank $\frac{1}{3}$ rd of the water filled by the pipe A leaks out. Find the time when the tank will be full.

(a) 18 hours (b) 12 hours
(c) 36 hours (d) None of these

44. Two pipes A and B can fill up a half full tank in 1.2 hours. The tank was initially empty. Pipe B was kept open for half the time required by pipe A to fill the tank by itself. Then, pipe A was kept open for as much time as was required by pipe B to fill up $\frac{1}{3}$ of the tank by itself. It was found that the tank was $\frac{5}{6}$ full. The least time in which any of the pipes can fill the tank fully is :

(a) 4.8 hours (b) 4 hours
(c) 3.6 hours (d) 8 hours

45. A tank of capacity 25 litres has an inlet and an outlet tap. If both are opened simultaneously, the tank is filled in 5 minutes. But if the outlet flow rate is doubled and taps are opened then the tank never gets filled up. Which of the

following can be outlet flow rate in litres/min?

(a) 2 (b) 6
(c) 4 (d) 3

46. Two taps are running continuously to fill a tank. The 1st tap could have filled it in 5 hours by itself and the second one by itself could have filled it in 20 hours. But the operator failed to realise that there was a leak in the tank from the beginning which caused a delay of one hour in the filling of the tank. Find the time in which the leak would empty the filled tank.

(a) 15 hours (b) 20 hours
(c) 25 hours (d) 40 hours

47. A cistern can be filled by two pipes filling separately in 36 min and 48 min respectively. Both pipes are opened together for a certain time but being jammed, only $\frac{4}{5}$ of full quantity water flows through the former and

only $\frac{3}{5}$ through the latter pipe.

The obstruction, however being suddenly removed, the cistern is filled in 17 minutes from that moment. How long was it before the overflow began?

(a) 6 min (b) 5 min
(c) 4 min (d) None of these

48. A cistern can be filled by two pipes filling separately in 30 min and 36 min respectively. Both pipes are opened together for a certain time but being jammed, only $\frac{5}{6}$ of full quantity water flows through the former and only $\frac{9}{10}$ through the latter pipe. The obstruction, however being suddenly removed, the cistern is filled in $15\frac{1}{2}$ minutes from that moment. How long was it before the overflow began?

(a) 1 min. (b) 2 min.
(c) $1\frac{1}{2}$ min. (d) $2\frac{1}{2}$ min.



49. Four pipes A, B, C and D are attached to a cistern. A can fill it in 20 min. B in 30 min and C in 60 minutes. D is a waste pipe for emptying it. After opening all the three pipes A, B and C a man leaves the cistern and returns when the cistern should have been just full. Finding however, that the waste pipe has been left open, he closes it and the cistern now gets filled in 3 minutes. In how much time the pipe D, if opened alone, empty full cistern.
- (a) $33\frac{1}{3}$ min (b) $32\frac{1}{3}$ min.
(c) $32\frac{2}{3}$ min. (d) $33\frac{2}{3}$ min.
50. Two pipes A and B can fill a cistern in 40 and 50 hours respectively, and a third pipe C can empty in 80 hours. If the pipe A is opened at 7 am and the pipe B at 9 am and the third pipe C at 12:00 noon. Then after how much time the tank will be filled?
- (a) $1\frac{1}{13}$ pm on next day
(b) $2\frac{1}{13}$ pm on next day
(c) $2\frac{1}{11}$ pm on next day
(d) None of these
51. Three pipes A, B and C are attached to a cistern. Pipes A and B can fill the tank in 20 & 30 hours respectively, and the pipe C can empty it in 60 hours. Pipes A and C are opened for the 1st hour and the pipe B and C are opened for the second hour and again A and C are opened for the third hour and this process continues till the cistern does not get full. Then find in how much time the tank will be filled ?
- (a) 30 hours (b) 20 hours
(c) 40 hours (d) 10 hours
52. Three pipes A, B and C are attached to a cistern pipe A and B can fill it in 30 hours and 20 hours respectively, and third pipe C can leak out 45 litres water per minute. If all the three pipes are opened simultaneously the cistern will be filled in 15 hours. Find the capacity of the cistern ?
- (a) 162,000 litres
(b) 160,00 litres
(c) 5760 litres
(d) 150,000 litres
53. A tank has two pipes. One pipe can fill it in 8 hours and other pipe can empty it in 5 hours. If $\frac{3}{4}$ part of the tank is filled and both pipes are opened together, in how much time the tank will be empty ?
- (a) $13\frac{1}{3}$ hours (b) 10 hours
(c) 6 hours (d) $3\frac{1}{3}$ hours
54. A tank has three pipes. The first pipe can fill $\frac{1}{2}$ part of the tank in 1 hour and the second pipe can fill $\frac{1}{3}$ part in 1 hour. The third pipe is for making the tank empty. When all three pipes are opened, $\frac{7}{12}$ part of the tank is filled in 1 hour. How much time will the third pipe take to empty the completely filled tank ?
- (a) 3 hours (b) 4 hours
(c) 5 hours (d) 6 hours
55. Three pipes A, B and C can fill a cistern in 6 hours. The three pipes are opened together but C is closed after 2 hours. A and B fill the remaining part in 7 hours. In how many hours C alone can fill this cistern ?
- (a) 12 hours (b) 14 hours
(c) 16 hours (d) 18 hours
56. Two pipes A and B can fill a cistern in 24 min. and 36 min. respectively. If both the pipes are opened together, after how much time B should be closed so that the tank is full in 20 min.
- (a) 6 min (b) 8 min
(c) 3 min (d) 12 min
57. There are three pipes in a cistern. Pipe A is for filling and Pipes B and C are for emptying the cistern. If A can fill the cistern in 5 hours and B and C can empty the cistern in 15 hours and 10 hours respectively then find how many hours will it take to completely fill a empty cistern, If all the pipes are opened simultaneously ?
- (a) 24 hours (b) 27 hours
(c) 40 hours (d) 30 hours
58. Two taps A and B can fill a cistern in 1 hour and 75 minutes respectively. There is also an outlet C. If all the three taps are opened together, the cistern is full in 50 minutes. How much time will be taken by C to empty the full cistern?
- (a) 100 min (b) 120 min
(c) 125 min (d) 90 min
59. There are three taps A, B and C in a tank. They can fill the tank in 10, 20 and 25 hours respectively. At first, all of them are opened simultaneously. Then after 2 hours, tap C is closed and A and B are kept running. After the 4th hour, tap B is also closed. The remaining work is done by tap A alone. Find the total time taken to fill the tank.
- (a) 7 hrs. 24 min.
(b) 7 hrs. 12 min.
(c) 7 hrs. 36 min.
(d) 7 hrs. 48 min.
60. Two pipes can fill a cistern in 14 and 16 hours respectively. The pipes are opened simultaneously and it is found that due to leakage in the bottom, it took 92 minutes more to fill the cistern. When the cistern is full, in what time will the leakage empty it ?
- (a) $43\frac{19}{23}$ hrs. (b) $43\frac{17}{23}$ hrs.
(c) $43\frac{13}{23}$ hrs. (d) $43\frac{18}{23}$ hrs.



61. Two pipes are running continuously to fill a tank. The first pipe could have filled it in 5 hours by itself and the second one by itself could have filled it in 20 hours. But a third pipe was there to empty it but the operator did not notice it, which caused a delay of one hour in the filling of the tank. Find the time in which the third pipe would empty the filled tank ?
 (a) 15 hours (b) 20 hours
 (c) 25 hours (d) 40 hours
62. A man and A woman together fill a tank with water. The man pours 4 litres of water every 3 minutes and the woman pours 3 litres of water every 4 minutes. How much time will it take to fill 200 litres of water in the tank ?
 (a) 1 hrs. 12 min.
 (b) 1 hrs. 24 min.
 (c) 1 hrs. 36 min.
 (d) 1 hrs. 48 min.
63. A tap having diameter 'd' can empty a tank in 40 minutes. How long another tap having diameter '2d' takes to empty the same tank ?
 (a) 5 minutes (b) 20 minutes
 (c) 10 minutes (d) 40 minutes
64. A tank can be filled by two pipes in 10 hours and 15 hours respectively. When the tank was empty, the two pipes were opened. After some time, the faster pipe was closed and the other pipe starts working with 100% of its efficiency then the tank was filled in 9 hours. After how much time from the start, was the first pipe closed?
 (a) 6 hours (b) 5 hours
 (c) 4 hours (d) 3 hours
65. A tank has two pipes, one pipe can fill it in 48 hours and other pipe can empty it in $22\frac{1}{2}$ hours but it acts with 75% of its efficiency. If $\frac{1}{4}$ part of the tank is filled where tank has two times more capacity than that tank. After that both pipes are opened together, in how much time the tank will be empty?
 (a) 80 hours (b) 60 hours
 (c) 48 hours (d) 20 hours
66. A can fill a tank in as much as time taken by B and C together. A and B together can fill the tank in 9 hours 36 minutes and C can fill it in 48 hours. The time (in hours) that B need to fill the tank alone is:
 (a) 24 (b) 30
 (c) 12 (d) 18
67. A cistern can be filled by three pipes A, B and C in 10, 15 and 25 hours respectively. All three pipes are open altogether at 7 am. At what time will the cistern be full?
 (a) 10 : 50 am (b) 11 : 50 pm
 (c) 12 : 00pm (d) 11 : 50 am
68. Two pipes can fill a cistern in 10 hours and 12 hours respectively. If both pipes are opened together, but the cistern has a leakage and the cistern is full in $7\frac{1}{17}$ hours. If the tank is full how long will it take to empty it by the leakage.
 (a) 30 hours (b) 25 hours
 (c) 20 hours (d) 24 hours
69. Two pipes M and N can fill a tank in 25 hours and 30 hours respectively. Another pipe P can empty it in 40 hours. All three pipes are opened together but after 5 hours pipe P is closed. Find the total number of hours they will take to fill the entire tank.
 (a) $15\frac{15}{44}$ (b) $10\frac{15}{44}$
 (c) $15\frac{5}{22}$ (d) None of these
70. Two filling pipes can fill a tank in $8\frac{1}{3}$ minutes and $12\frac{1}{2}$ minutes respectively and a third pipe can carry off 162 litres of water in 1 minute. When the tank is full all three pipes are open together and it is emptied in 4 minutes. Find the capacity of the tank.
 (a) 360 litres (b) 320 litres
 (c) 440 litres (d) None of these
71. A, B and C can fill a tank in 20, 24 and 30 hours respectively. In the starting A is opened after one hour B is also opened and after one more hour C is opened. In what time the tank is full?
 (a) $6\frac{13}{15}$ hours (b) $9\frac{2}{15}$ hours
 (c) $8\frac{9}{15}$ hours (d) None of these
72. A tank is fitted with three pipes A, B and C having radii 2 cm, $\frac{5}{3}$ cm, 4 cm respectively. Rate of flow in pipes is proportional to the square of the radius of pipes. The smallest pipe can fill the tank in 144 minutes. Find the time taken by all the three pipes to fill the tank while they are opened together.
 (a) $17\frac{23}{41}$ min (b) $25\frac{59}{205}$ min
 (c) $19\frac{23}{41}$ min (d) None of these
73. Two pipes can fill a cistern in 48 minutes and 36 minutes. Both the pipes are opened at 8 am. and after some time first pipe is closed and the tank is filled at 8 : 25 : 30 am. Find the time when first pipe was closed.
 (a) 8 : 10 : 30 am
 (b) 8 : 20 : 28 am
 (c) 8 : 14 am
 (d) 8 : 14 : 30 am



74. Two pipes A and B can separately fill a tank in 6 hours and 8 hours respectively. Both the pipes are opened together, but $2\frac{1}{2}$ hours after the start, the pipe B is turned off. How much time will it take to fill the tank ?
- (a) $4\frac{1}{2}$ hours (b) $4\frac{3}{4}$ hours
(c) $4\frac{1}{8}$ hours (d) $4\frac{1}{4}$ hours
75. Two taps A and B can fill a cistern in 30 minutes and 45 minutes respectively. There is third exhaust tap C at the bottom of the tank. If all the taps are opened at the same time the cistern will be full in 45 minutes. In what time can exhaust tap C empty the cistern when full?
- (a) 30 min. (b) 15 min.
(c) 18 min. (d) 20 min.
76. A tap can fill a cistern in 12 minutes while another tap B can empty it in 8 minutes. The pipe A is kept open for 6 minutes in the beginning and then second pipe B is also opened. In what time will the cistern be emptied?
- (a) 6 min. (b) 12 min.
(c) 18 min. (d) 4 min.
77. A tank can be filled by two pipes in 20 minutes and 30 minutes respectively. When the tank was empty, the two pipes were opened. After some time, the first pipe was stopped and the tank was filled in 18 minutes. After how much time of the start was the first pipe closed ?
- (a) 5 minutes (b) 8 minutes
(c) 10 minutes (d) 12 minutes
78. A pipe can fill a tank in 'x' hours and another pipe can empty it in 'y' ($y > x$) hours. If both the pipes are open. In how many hours will the tank be full?
- (a) $(x - y)$ hrs (b) $(y - x)$ hrs
(c) $\frac{xy}{x - y}$ hrs (d) $\frac{xy}{y - x}$ hrs
79. 12 pumps working 6 hours a day can empty a completely filled reservoir in 15 days. How many such pumps working 9 hours a day will empty the same reservoir in 12 days?
- (a) 15 (b) 9
(c) 10 (d) 12
80. A tap takes 36 hours extra to fill a tank due to a leakage equivalent to half of its inflow. Find the time taken by tap A to fill the tank?
- (a) 36 hrs (b) 24 hrs
(c) 30 hrs (d) 18 hrs
81. A tank can be filled with water by two pipes, A and B together in 36 minutes. If the pipe B was stopped after 30 minutes, the tank is filled in 40 minutes. The pipe B can alone fill the tank in
- (a) 45 min (b) 60 min
(c) 75 min (d) 90 min
82. Two pipes A and B can fill a water tank in 20 and 24 minutes respectively and a third pipe C can empty at the rate of 3 gallons per minute. If A, B and C are opened together to fill the tank in 15 minutes, find the capacity of the tank ?
- (a) 180 (b) 150
(c) 120 (d) 60
83. Three pipes P, Q and R can separately fill a cistern in 4, 8 and 12 hours respectively. Another pipe S can empty the completely filled cistern in 10 hours. Which of the following arrangements will fill the empty cistern in less time than others?
- (a) Q alone is open
(b) P, R and S are open
(c) P and S are open
(d) P, Q and S are open
84. A tank has a leakage which would empty the completely filled tank in 10 hours. If the tank is full of water and a tap is opened which admits 4 litres of water per minute in the tank, the leak takes 15 hours to empty the tank. How many litres of water does the tank holds?
- (a) 2400 l (b) 4500 l
(c) 1200 l (d) 7200 l
85. An empty tank can be filled by pipe A in 4 hours and by pipe B in 6 hours. If the two pipes are opened for 1 hour each alternately with first opening pipe A, then the tank will be filled in
- (a) $1\frac{3}{4}$ hours (b) $2\frac{3}{5}$ hours
(c) $4\frac{2}{3}$ hours (d) $5\frac{1}{2}$ hours
86. A boy and A girl together fill a cistern with water. The boy pours 4 litres of water every 3 minutes and the girl pours 3 litres of water every 4 minutes. How much time will it take to fill 100 litres of water in the cistern?
- (a) 36 minutes (b) 42 minutes
(c) 48 minutes (d) 44 minutes
87. Two pipes can fill a cistern separately in 10 hours and 15 hours. They can together fill the cistern in:
- (a) 6 hours (b) 7 hours
(c) 8 hours (d) 9 hours
88. Three taps A, B and C together can fill an empty cistern in 10 minutes. The tap A alone can fill it in 30 minutes and the tap B alone in 40 minutes. How long will the tap C alone take to fill it?
- (a) 16 minutes
(b) 24 minutes
(c) 32 minutes
(d) 40 minutes
89. One tap can fill a water tank in 40 minutes and another tap can make the filled tank empty in 60 minutes. If both the taps are open, in how many hours will the empty tank be filled?
- (a) 2 hours (b) 2.5 hours
(c) 3 hours (d) 3.5 hours



90. A tap can fill an empty tank in 12 hours and another tap can empty half the tank in 10 hours. If both the taps are opened simultaneously, how long would it take for the empty tank to be filled to half of its capacity?
- (a) 10 hrs (b) 30 hrs
(c) 15 hrs (d) 20 hrs
91. Two pipes, P and Q can fill a cistern in 12 and 15 minutes respectively. Both are opened together, but at the end of 3 minutes, P is turned off. In how many more minutes will Q fill the cistern?
- (a) 7 minutes (b) $7\frac{1}{2}$ minutes
(c) 8 minutes (d) $8\frac{1}{4}$ minutes
92. Pipe A can fill a cistern in 6 hours and pipe B can fill it in 8 hours. Both the pipes are opened simultaneously, but after two hours, pipe A is closed. How many hours, will B take to fill the remaining part of the cistern?
- (a) 2 hrs (b) $3\frac{1}{3}$ hrs
(c) $2\frac{2}{3}$ hrs (d) 4 hrs
93. A cistern is normally filled in 8 hours but takes another 2 hours longer to fill because of a leak in its bottom. If the cistern is full, the leakage will empty it in:
- (a) 16 hours (b) 20 hours
(c) 25 hours (d) 40 hours
94. Pipes P and Q can fill a tank in 10 hours and 12 hours respectively and C can empty it in 6 hours. If all the three are opened at 7 am, at what time will one-fourth of the tank be filled?
- (a) 10 am (b) 10 pm
(c) 11 pm (d) 11 am
95. A tank can be filled by pipe A in 2 hours and pipe B in 6 hours. At 10 am pipe A was opened. At what time will the tank be filled if pipe B is opened at 11 A.M. ?
- (a) 12.45 A.M. (b) 5 P.M.
(c) 11.45 A.M. (d) 12 P.M.
96. If $\frac{3}{5}$ th of a cistern is filled in 1 minute, the time needed to fill the rest is :
- (a) 40 sec (b) 30 sec
(c) 36 sec (d) 24 sec
97. A cylindrical cistern of diameter 25 cm is full of water. If 11 litres of water is drawn off, the water level in the cistern will drop by?
- (use $\pi = \frac{22}{7}$)
- (a) $10\frac{1}{2}$ cm (b) $12\frac{6}{7}$ cm
(c) $22\frac{2}{5}$ cm (d) $20\frac{2}{5}$ cm
98. There are two pumps to fill a tank with water. First pump can fill the empty tank in 8 hours, while the second in 10 hours. If both the pumps are opened at the same time and kept open for 4 hours, the part of the tank that will be filled up is:
- (a) $\frac{9}{10}$ (b) $\frac{1}{10}$
(c) $\frac{2}{5}$ (d) $\frac{1}{5}$
99. Two pipes, P and Q, together can fill a cistern in 20 minutes and P alone can fill in 30 minutes. Then Q alone can fill the cistern in
- (a) 62 minutes (b) 60 minutes
(c) 61 minutes (d) 51 minutes
100. Two pipes A and B can fill a cistern in 3 hours and 5 hours respectively. Pipe C can empty in 2 hours. If all the three pipes are open, in how many hours the cistern will be full?
- (a) can't be filled (b) 10 hours
(c) 15 hours (d) 30 hours
101. Three taps A, B, C can fill an overhead tank in 4, 6 and 12 hours respectively. How long would the three taps take to fill the tank if all of them are opened together ?
- (a) 2 hrs. (b) 4 hrs.
(c) 3 hrs. (d) 5 hrs.
102. If two pipes function simultaneously, a tank is filled in 12 hours. One pipe fills the tank 10 hours faster than the other. How many hours does the faster pipe alone takes to fill the tank ?
- (a) 20 hrs (b) 18 hrs
(c) 15 hrs (d) 12 hrs
103. Two pipes X and Y can fill a cistern in 24 minutes and 32 minutes respectively. If both the pipes are opened together, then after how much time (in minutes) should Y be closed so that the tank is full in 18 minutes?
- (a) 10 (b) 8
(c) 6 (d) 5
104. Three pipes A, B and C can fill a tank in 6 hours, 9 hours and 12 hours respectively. B and C are opened for half an hour, then A is also opened. The time taken by the three pipes together to fill the remaining part of the tank is :
- (a) 3 hours (b) 2 hours
(c) $2\frac{1}{2}$ hours (d) $3\frac{1}{2}$ hours
105. Which of these pipes will empty a pool the fastest ?
- (a) One pipe of diameter 60 m
(b) Two pipes of diameter 30 cm
(c) Three pipes of diameter 20 cm
(d) None of these
106. A water tank can be filled by a tap in 30 minutes and another tap can fill it in 60 minutes. If both the taps are kept open for 5 minutes and then the first tap is closed, how long will it take for the tank to be full ?
- (a) 20 minutes
(b) 25 minutes
(c) 30 minutes
(d) 45 minutes



107. Two pipes A and B can fill a tank in 36 minutes and 45 minutes respectively. Another pipe C can empty the tank in 30 minutes. Firstly A and B are opened. After 7 minutes, C is also opened. The tank is filled up in
(a) 39 minutes (b) 46 minutes
(c) 40 minutes (d) 45 minutes
108. Two pipes A and B can separately fill a tank in 2 hours and 3 hours respectively. If both the pipes are opened simultaneously in the empty tank, then the tank will be filled in
(a) 1 hour 12 minutes
(b) 2 hours 30 minutes
(c) 1 hour 15 minutes
(d) 1 hour 20 minutes
109. A tap drips at a rate of one drop/sec. 600 drops make 100ml. The number of litres wasted in 300 days is:
(a) 4320000 (b) 432000
(c) 43200 (d) 4320
110. Having the same capacity 9 taps fill up a water tank in 20 minutes. How many taps of the same capacity are required to fill up the same water tank in 15 minutes?
(a) 10 (b) 12
(c) 15 (d) 18
111. Two pipes A and B can fill a tank with water in 30 minutes and 45 minutes respectively. The third pipe C can empty the tank in 36 minutes. Firstly A and B are opened. After 12 minutes C is opened. Total time (in minutes) in which the tank will be filled up is:
(a) 12 (b) 24
(c) 30 (d) 36
112. Pipe A can fill a tank in 4 hours and pipe B can fill it in 6 hours. If they are opened on alternate hours and if pipe A is opened first then in how many hours, the tank shall be full?
(a) $4\frac{1}{2}$ (b) $4\frac{2}{3}$
(c) $3\frac{1}{2}$ (d) $3\frac{1}{4}$
113. A tank has two pipes. The first pipe can fill it in 4 hours and the second can empty it in 16 hours. If two pipes be opened together at same time, then the tank will be filled in
(a) $5\frac{1}{2}$ hours (b) 6 hours
(c) 10 hours (d) $5\frac{1}{3}$ hours
114. A pipe can fill a tank in 24 hours. Due to a leakage in the bottom, it is filled in 36 hours. If the tank is half full, how much time will they take to empty the tank?
(a) 24 hrs (b) 48 hrs
(c) 36 hrs (d) 72 hrs
115. A water reservoir has two inlets and one outlet. Through the inlet it can be filled in 3 hours and 3 hours 45 minutes respectively. It can be emptied completely in 1 hour by the outlet. If the two inlets are opened at 01:00pm and 02:00pm respectively and the outlet at 03:00pm then it will be emptied at?
(a) 05:55 pm (b) 05:00 pm
(c) 05:20 pm (d) 05:30 pm

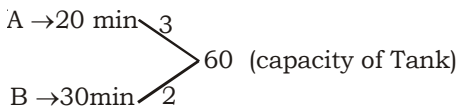


ANSWER KEY

1. (b)	13. (b)	25. (b)	37. (b)	49. (a)	61. (b)	73. (c)	85. (c)	97. (c)	109. (d)
2. (b)	14. (c)	26. (c)	38. (c)	50. (a)	62. (c)	74. (c)	86. (c)	98. (a)	110. (b)
3. (d)	15. (a)	27. (a)	39. (b)	51. (c)	63. (c)	75. (a)	87. (a)	99. (b)	111. (b)
4. (b)	16. (a)	28. (a)	40. (a)	52. (a)	64. (c)	76. (b)	88. (b)	100. (d)	112. (b)
5. (d)	17. (a)	29. (b)	41. (a)	53. (b)	65. (b)	77. (b)	89. (a)	101. (a)	113. (d)
6. (d)	18. (a)	30. (d)	42. (d)	54. (b)	66. (a)	78. (d)	90. (c)	102. (a)	114. (c)
7. (d)	19. (a)	31. (a)	43. (a)	55. (b)	67. (d)	79. (c)	91. (d)	103. (b)	115. (c)
8. (a)	20. (a)	32. (a)	44. (b)	56. (a)	68. (d)	80. (a)	92. (b)	104. (c)	
9. (a)	21. (c)	33. (b)	45. (b)	57. (d)	69. (a)	81. (d)	93. (d)	105. (a)	
10. (a)	22. (c)	34. (a)	46. (b)	58. (a)	70. (a)	82. (c)	94. (b)	106. (d)	
11. (a)	23. (b)	35. (d)	47. (b)	59. (b)	71. (d)	83. (d)	95. (c)	107. (b)	
12. (a)	24. (c)	36. (a)	48. (a)	60. (a)	72. (a)	84. (d)	96. (a)	108. (a)	

Solution

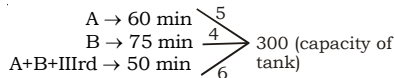
1. (b)



A & B together to fill the tank

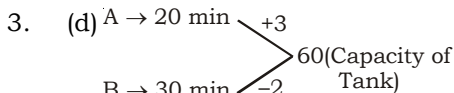
$$\text{in} = \frac{60}{5} = 12 \text{ minutes}$$

2. (b)

Eff. of IIIrd pipe = $5 + 4 - 6 = 3$ units

III rd Pipe alone empty the tank

$$= \frac{300}{3} = 100 \text{ minutes}$$



Tank filled by A in 1 min.

$$= 1 \times 3 = 3 \text{ units}$$

Tank empty by B in 1 min. = 1×2

$$= 2 \text{ units}$$

∴ Tank filled in 2 min.

$$= 3 - 2 = 1 \text{ unit}$$

∴ 1 unit tank fill in 2 min.

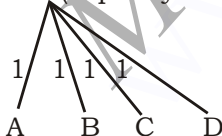
∴ 60 units tank fill in $2 \times 60 = 120$ min.4. (b) ∴ $\frac{1}{3}$ rd tank = 80 lit.∴ full tank = $80 \times 3 = 240$ lit.

Hence, the quantity of water that holds half of the tanks

$$= \frac{240}{2} = 120 \text{ lit.}$$

5. (d) Let the pipes are A, B, C & D having same efficiencies.

6 (capacity of tank)



Time taken by A to fill the half

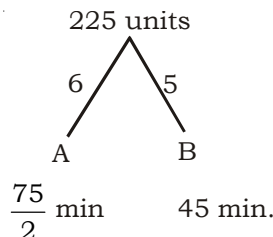
$$\text{tank} = \frac{3}{1} = 3 \text{ hrs.}$$

Time tanken by all the pipes to

fill the remaining half tank = $\frac{3}{4}$

$$\text{hrs} = \frac{3}{4} \times 60 = 45 \text{ min}$$

∴ Total time taken to fill the tank = 3 hrs 45 min

6. (d) $37\frac{1}{2}$ min. = $\frac{75}{2}$ minA fills the tank in 30 min = 30×6 = 180 unitsRemaining = $225 - 180 = 45$ units

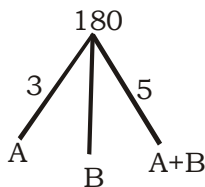
Time taken by B to fill the tank

$$45 \text{ units} = \frac{45}{5} = 9 \text{ min}$$

Hence, B is turned off after 9 min.

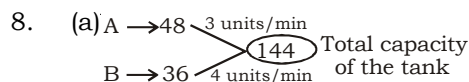
7. (d) Tank filled by B in 30 min

$$= \frac{30}{36} = \frac{5}{6}$$

∴ Remaining part of tank = $1 - \frac{5}{6} = \frac{1}{6}$ ∴ $\frac{1}{6}$ th tank is completed in $(40 - 30)$ = 10 min∴ Time taken by $\frac{1}{6}$ th tank = 10 min∴ Time taken by A to fill the full tank = $6 \times 10 = 60$ min.efficiency of B = $5 - 3 = 2$ units

∴ Time taken by B to fill the tank

$$= \frac{180}{2} = 90 \text{ min}$$



According to the question,

Tap B would be open till the end so part filled by pipe B in 25 min

$$30 \text{ sec.} = 4 \times \frac{51}{2} = 102 \text{ units}$$

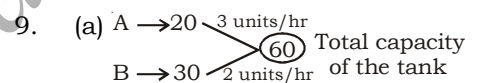
$$\left[\therefore 25 \text{ min } 30 \text{ sec} = \frac{51}{2} \text{ min} \right]$$

Reamining capacity of the tank = $(144 - 102) = 42$ units

This remaining part is filled by pipe A.

$$\text{So required time} = \frac{42}{3} = 14 \text{ min}$$

So pipe A should be closed after 14 min.



According to the question :-

Required time for filling $\frac{1}{3}$ rd of the

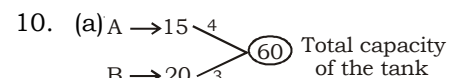
$$\text{tank} = \frac{60 \times 1}{3(3+2)} = 4 \text{ hours}$$

Now leaks has been developed. leaked out water

$$= 5 \times \frac{1}{3} = \frac{5}{3} \text{ units/hour}$$

Now required time to fill the rest capacity of the tank

$$= \frac{40}{\left(5 - \frac{5}{3}\right)} = \frac{40}{10} \times 3 \Rightarrow 12 \text{ hours}$$

Total time to fill the tank = $12 + 4 \Rightarrow 16 \text{ hrs}$ 

According to the question,

Time required for filling $\frac{1}{4}$ th part of the tank

$$= \frac{60}{4 \times 7} = \frac{15}{7} \text{ hours}$$

Now leaks have been develop.

∴ Leaked out water

$$= 7 \times \frac{1}{5} = \frac{7}{5} \text{ units/hour}$$

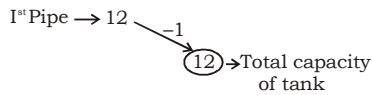
Now required time to fill the rest capacity of the tank

$$= \frac{45}{7 - \frac{7}{5}} = \frac{45 \times 5}{28} = \frac{225}{28}$$

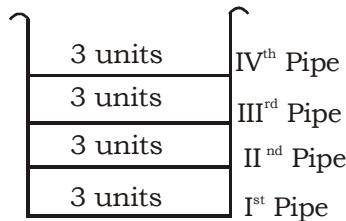
$$\text{Total time} = \frac{15}{7} + \frac{225}{28}$$

$$= \frac{285}{28} = 10 \frac{5}{28} \text{ hours}$$

11. (a) Let the capacity of the tank be 12 units



$$\frac{3}{4}^{\text{th}} \text{ height} = \frac{3}{4} \times 12 = 9$$



According to the question:-

All the pipes are set on equal intervals.

Time required to empty the tank

$$= \frac{3}{4} + \frac{3}{3} + \frac{3}{2} + \frac{3}{1}$$

$$= \frac{9 + 12 + 18 + 36}{12} = \frac{75}{12}$$

$$= 6 \frac{3}{12} = 6 \frac{1}{4} = \mathbf{6 \text{ hours } 15 \text{ min}}$$

12. (a) A $\rightarrow 30$ $\frac{12 \text{ units/min}}{360}$ Total capacity
B $\rightarrow 36$ $\frac{10 \text{ units/min}}{360}$

If both pipes A and B working with original efficiency then filled

part in $16 \frac{1}{2}$ min

$$= \frac{33}{2} \times (10 + 12) = 33 \times 11 = 363 \text{ units}$$

Extra units = $363 - 360 = 3$ units

This is because we did not count the problem time.

Now efficiency after problem occurred:-

$$\text{Efficiency of A} = \frac{5}{6} \times 12$$

$$= 10 \text{ units/min}$$

$$\text{Efficiency of B} = 10 \times \frac{9}{10}$$

$$= 9 \text{ units/min}$$

$$\text{Combined efficiency} = (10 + 9) = 19$$

Difference between original and new efficiency

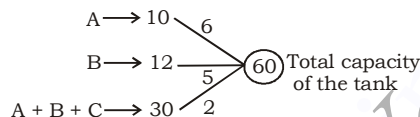
$$= (22 - 19) = 3 \text{ units/min}$$

Now Required time to fill 3 units

$$= \frac{3}{3} = 1 \text{ min}$$

So we can say after 1 min the problem was removed.

13. (b) According to the question:-



$$\text{Efficiency of tap C} = [(6 + 5) - 2]$$

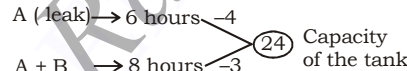
$$= 9 \text{ units/hour}$$

Required time for C to empty the

$$\text{tank} = \frac{60}{9} \text{ hours}$$

14. (c) Let A be the leakage and B be the filling pipe.

According to the question:-



It means in starting Leak A leaks out

4 units/hour and now both A (Leak) and

B (filling pipe) are opened together so they

leaks out 3 units/hour.

∴ Efficiency of filling pipe

$$= (4 - 3) = 1 \text{ unit/hour}$$

Required time for B (filling pipe) to

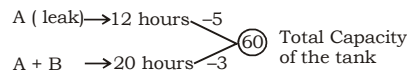
$$\text{fill the tank} = \frac{24}{1} = 24 \text{ hours}$$

And pipe B fills 4 litres/min [Given]

$$\therefore \text{Capacity} = 4 \times 24 \times 60 = \mathbf{5760 \text{ litres}}$$

15. (a) Let A be the leakage and B be the filling pipe.

According to the question:-



It means in starting leak A leaks out

5 units/hour and now both filling pipe (B)

and leak (A) are opened together so they leak out 3 units/hour.

$$\therefore \text{Efficiency of filling pipe} = (5 - 3) = 2 \text{ units/hour}$$

Required time for B (filling pipe)

$$\text{to fill the tank} = \frac{60}{2} = 30 \text{ hours}$$

And pipe B fills 20 litres/min [Given]

∴ Capacity of the tank

$$= 20 \times 30 \times 60 = 36000 \text{ litres}$$

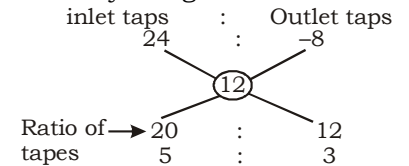
16. (a) inlet tap $\rightarrow 12$ $\frac{3}{36}$ Total Capacity of the tank
Outlet tap $\rightarrow -36$ $\frac{1}{36}$

According to the question :-

Required time to fill the tank = 3 hours

$$\text{Avg. efficiency} = \frac{36}{3} = 12 \text{ units/hrs}$$

Now By alligation method :-



Required number of water taps

$$= \frac{8}{(5 + 3)} \times 5 = 5$$

Alternatively:-

Let the number of filling pipes = x

$$\therefore \text{the outlet pipes} = (8 - x)$$

According to the question :-

$$= \frac{x}{12} - \frac{8 - x}{36}$$

$$= \frac{1}{3} = \frac{3x - 8 + x}{36}$$

$$= \frac{1}{3}$$

$$\Rightarrow 4x - 8 = 12$$

$$\Rightarrow 4x = 20$$

$$\Rightarrow \mathbf{x = 5}$$

$$\therefore \text{Number of inlet pipes} = 5 \text{ and, Number of outlet pipes} = (8 - 5) = 3$$

17. (a) Let the number of water taps = x
 $\therefore$ the number of outlet taps = $(9 - x)$
 According to the question:-

$$\Rightarrow \frac{x}{9} - \frac{(9-x)}{9} = \frac{1}{9}$$

$$\Rightarrow \frac{x-9+x}{9} = \frac{1}{9}$$

$$\Rightarrow 2x - 9 = 1$$

$$\Rightarrow x = 5$$

- $\therefore$ Number of water taps = 5 and,
 Number of outlet taps = $(9 - 5) = 4$

Alternatively:

For alligation method refer question no. 16.

18. (a) Let the number of water taps = x

- $\therefore$ the number of outlet taps = $(12 - x)$

According to the question:-

$$\Rightarrow \frac{x}{6} - \frac{(12-x)}{12} = \frac{1}{4}$$

$$\Rightarrow \frac{2x-12+x}{12} = \frac{1}{4}$$

$$\Rightarrow 3x - 12 = 3$$

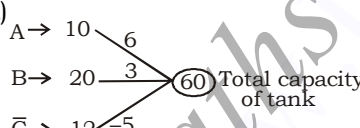
$$\Rightarrow 3x = 15$$

$$\Rightarrow x = 5$$

- $\therefore$ Number of inlet water taps = 5 and,
 Number of outlet taps = $(12 - 5) = 7$

Alternatively:

For alligation method refer question no. 16.

19. (a) 

Water filled by all the three pipes
 (A + B + C) in 3 hours

$$= (6 + 3 - 5) = 4 \text{ units}$$

Time : Work done

$$3 \text{ hours} \rightarrow 4 \text{ units}$$

$$\downarrow \times 13 \quad \downarrow \times 13$$

$$39 \text{ hours} \quad 52 \text{ units}$$

$$\text{Remaining work} = (60 - 52)$$

$$= 8 \text{ units}$$

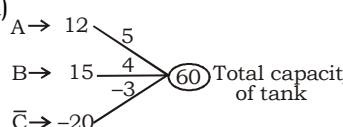
$$\text{Work done by A on 14th hr} = 6 \text{ units}$$

$$\text{Remaining work} = (8 - 6) = 2 \text{ units}$$

$$\text{Required time} = \frac{2}{3} \text{ hr}$$

Total Required time

$$= 39 + 1 + \frac{2}{3} = 40 \frac{2}{3} \text{ hr}$$

20. (a) 

According to the question:-

Water filled by the pipe A in 2 hours = $5 \times 2 = 10$ units

Water filled by the pipe B in 1 hour = $4 \times 1 = 4$ units

Total water filled

$$= (10 + 4) = 14 \text{ units}$$

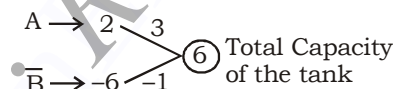
Now all the pipes will work together.

$\therefore$ Required time

$$= \frac{(60-14)}{(5+4-3)} = \frac{46}{6} = \frac{23}{3}$$

$$\text{Total time} = 12 + \frac{23}{3} = 9 \frac{2}{3} \text{ hours}$$

21. (c) Let A be the inlet pipe and B be the outlet pipe.



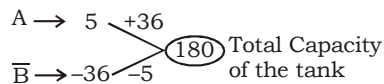
Remaining part of the tank

$$= 6 \times \frac{2}{3} = 4 \text{ units}$$

Required time to fill the tank

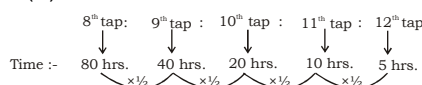
$$= \frac{4}{(3-1)} = 2 \text{ hours}$$

22. (c) Let A be the inlet pipe and B be the outlet pipe.



Since, an inlet pipe $\left(\frac{36}{5} = 7.2\right)$ times efficient than an outlet pipe. Therefore in order to tank never overflow we will need total 8 outlet pipes.

23. (b)



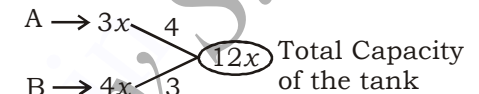
$$\text{Required time} = \frac{20}{(4+1)}$$

$$= 4 \text{ hours}$$

24. (c) Let the time taken by pipe B = $4x$

$\therefore$ Time Taken by pipe A

$$= \frac{3}{4} \times 4x = 3x$$



Required time by (A + B)

$$= \frac{12x}{(4+3)} = \frac{12x}{7}$$

According to the question:

$$= \frac{12}{7}x + \frac{12x}{7} \times \frac{3}{4} = 33$$

$$= \frac{12x+9x}{7} = 33$$

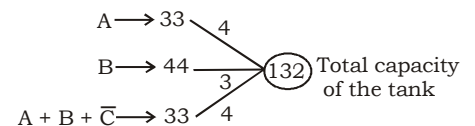
$$\Rightarrow \frac{21x}{7} = 33 \Rightarrow x = 11$$

Now required time by pipe A

$$= 3 \times 11 = 33 \text{ hours}$$

and required time by pipe B

$$= 4 \times 11 = 44 \text{ hours}$$



Time required by the pipe (C)

$$= \frac{132}{(7-4)} = 44 \text{ hours}$$

25. (b) Let the number of inlet pipes = x

The number of outlet pipes

$$= (8 - x)$$

According to the question:

$$\Rightarrow \frac{(8-x)}{6} - \frac{x}{8} = \frac{1}{6}$$

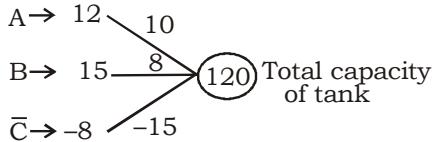
$$\Rightarrow \frac{32-4x-3x}{24} = \frac{1}{6}$$

$$\Rightarrow -7x + 32 = 4$$

$$\Rightarrow x = 4$$

- $\therefore$ Number of inlet pipes = 4 and,
 Number of outlet pipes = $(8 - 4) = 4$

26. (c) Let A and B are the inlet pipes and C is the outlet pipe.



Water filled by the pipes A and B in the first two hours

$$= (10+8) \times 2 = 36 \text{ units}$$

Now for the next hour all the three pipes are open.

Water filled in the third hour

$$= (10 + 8 - 15) = 3 \text{ units}$$

Time	Filled (Water)
3 hours	39 units

$$\downarrow \times 3 \quad \downarrow \times 3$$

$$9 \text{ hours} \quad 117 \text{ units}$$

Now remaining capacity of the tank = $120 - 117 = 3 \text{ units}$

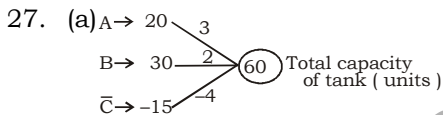
Now only pipes A and B are open.

$$\therefore \text{Required time} = \frac{3}{(10+8)}$$

$$= \frac{1}{6} \times 60 = 10 \text{ minutes.}$$

$$\text{Total time} = 9 + 10 \text{ minutes}$$

$$= \mathbf{9 \text{ hrs. } 10 \text{ min.}}$$



water filled by all the three pipes

(A + B + C) in 1 min

$$= (3 + 2 - 4) = 1 \text{ unit}$$

Time : Filled Capacity

$$3 \text{ min} \rightarrow 1 \text{ unit}$$

$$\downarrow \times 55 \quad \downarrow \times 55$$

$$165 \text{ min} \quad 55 \text{ units}$$

Remaining capacity

$$= (60 - 55) = 5 \text{ units}$$

In 166th min the pipe A will work so filled part = 3 units

$$\text{Remaining part} = (5 - 3) = 2 \text{ units}$$

$$\text{Required time by B} = \frac{2}{2} = 1 \text{ min.}$$

Total time

$$= 165 + 1 + 1 = \mathbf{167 \text{ min}}$$

28. (a) Let the cold water pipe be A and the hot water pipe be B.



Required time by (A + B) to fill

$$\text{the tank} = \frac{30}{(2+3)} = 6 \text{ min}$$

According to the question:-

Water filled by the pipes (A + B) in 4 minutes = $4 \times 5 = 20 \text{ units}$

Now it is emptied by the waste pipe (C) in 6 min.

Required time by the waste pipe (C) to empty the whole tank

$$= \frac{30}{20} \times 6 = \mathbf{9 \text{ min}}$$

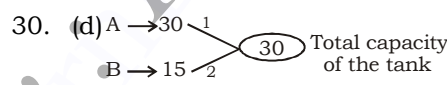
29. (b) **Note:** In such type of questions use this method to save your valuable time.

Let the time taken by the pipes (A + B) = $x \text{ min}$

According to the question :-

$$\begin{array}{ccc} A & : & A+B & : & B \\ x+4 & : & x & : & x+9 \end{array}$$

$$\text{Required time} = \sqrt{4 \times 9} = \mathbf{6 \text{ min}}$$



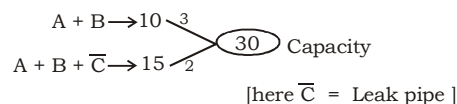
Required time for (A + B) to fill

$$\text{the cistern} = \frac{30}{(1+2)} = 10 \text{ hours}$$

According to the question:

When leakage is open then,

$$\text{required time} = (10 + 5) = 15 \text{ hours}$$



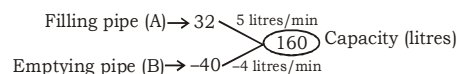
$$\text{Efficiency of the leak} = (3 - 2)$$

$$= 1 \text{ unit/hr}$$

Required time for leak to empty

$$\text{the tank} = \frac{30}{1} = 30 \text{ hours}$$

31. (a)



Efficiency of 12 filling pipes

$$= 12 \times 5 = 60 \text{ litres/min}$$

Efficiency of 8 emptying pipes

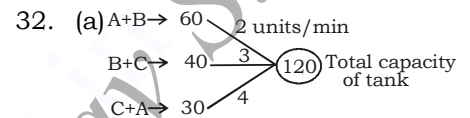
$$= 8 \times -4 = -32 \text{ litres/min}$$

Net efficiency = $(60 - 32)$

$$= 28 \text{ litres/min}$$

According to the question:

$$\text{Capacity of the tank} = \frac{28}{28} \times 160 = \mathbf{160 \text{ litres}}$$



Efficiency of (A + B + C)

$$= \frac{(2+3+4)}{2} = 4.5 \text{ units/min}$$

$$\text{Efficiency of C} = (4.5 - 2)$$

$$= 2.5 \text{ units/min}$$

$$\text{Efficiency of B} = (4.5 - 4)$$

$$= 0.5 \text{ unit/min}$$

$$\text{Efficiency of A} = (4.5 - 3)$$

$$= 1.5 \text{ units/min}$$

Required time by A to fill the tank

$$= \frac{120}{1.5} = \mathbf{80 \text{ min}}$$

Required time by B to fill the tank

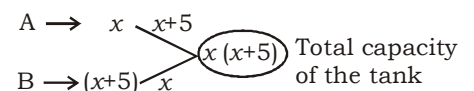
$$= \frac{120}{0.5} = \mathbf{240 \text{ min}}$$

Required time by C to fill the tank

$$= \frac{120}{2.5} = \mathbf{48 \text{ min}}$$

33. (b) Let the time taken by the faster pipe A = $x \text{ hours}$

Then the time taken by the slower pipe B = $(x + 5) \text{ hours}$



According to the question:-

$$\frac{x(x+5)}{x+(x+5)} = 6$$

$$\Rightarrow x^2 + 5x = 12x + 30$$

$$\Rightarrow x^2 - 7x - 30 = 0$$

$$\Rightarrow x^2 - 10x + 3x - 30 = 0$$

$$\Rightarrow x(x-10) + 3(x-10) = 0$$

$$\Rightarrow (x-10)(x+3) = 0$$

$$x = 10 \text{ hours}$$

Time taken by the faster pipe A
= 10 hours

Time taken by the slower pipe B
= (10 + 5) = 15 hours

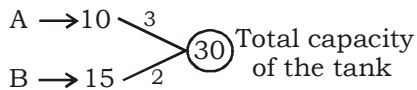
Alternatively:

Note :- In such type of questions always take help from options to save your valuable time.

As : Option (b)

Time taken by the faster pipe A
= 10 hrs

Time taken by the slower pipe B
= 15 hrs.



Required time for (A + B) to fill the
tank = $\frac{30}{(3+2)} = 6 \text{ hours}$

Now check the question condition.
So it is same Hence, option (b) is correct.

34. (a) A : B
Efficiency:- 5 : 1
Time :- 1 : 5

$$[\therefore \text{Efficiency} \propto \frac{1}{\text{Time}}]$$

Capacity of the tank = 36×1
= 36 units

Required time for both the pipes

$$(A + B) = \frac{36}{(5+1)} = 6 \text{ minutes}$$

35. (d) $1\frac{1}{20}$ hours = 63 minutes

According to the question :-
Required time

$$= \frac{63 \times (4)^2}{(1)^2 + (2)^2 + (4)^2}$$

$$\Rightarrow \frac{63 \times 16}{1 + 4 + 16} \Rightarrow 48 \text{ minutes}$$

36. (a) A → 20 — 5 — (100) Total capacity
B → 25 — 4 — (in units)
Water filled by the pipes
(A + B) in 5 minutes
= $9 \times 5 = 45 \text{ units}$

Remaining capacity of the tank
= (100 - 45) = 55 units

Required time for A to fill the
remaining part

$$= \frac{55}{5} = 11 \text{ minutes}$$

Total time for filling = (11 + 5)
= 16 minutes

Alternatively:-



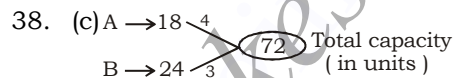
According to the question :-

Water filled by the pipe B in 5
minutes = $4 \times 5 = 20 \text{ units}$

Remaining capacity of the tank
= (100 - 20) = 80 units

$$\text{Required time} = \frac{80}{5} = 16 \text{ min}$$

37. (b) Required time = $\frac{9}{2} \times 8$
= 6 minutes



Let the cistern be filled in x
minutes.

$\therefore$ Pipe B is opened for x minutes
and pipe A is opened for $(x - 6)$
minutes.

Now According to the question:-

$$3x + 4(x - 6) = 72$$

$$3x + 4x - 24 = 72$$

$$7x = 96$$

$$\Rightarrow x = \frac{96}{7} = 13\frac{5}{7} \text{ min.}$$

Alternatively:-



Water filled by the pipe A in 6
minutes = $6 \times 4 = 24 \text{ units}$

Total capacity = $24 + 72 = 96 \text{ units}$

$$\text{Required time} = \frac{96}{(4+3)} = \frac{96}{7}$$

$$= 13\frac{5}{7} \text{ min}$$

39. (b) A → 12 min — 4 units/hr — (48) Total capacity
B → 16 min — 3 units/hr — of the tank

Let both pipes remain clogged
for x minutes and hence full
flow began after x minutes only.

$\therefore$ Part of cistern filled in x min +
part of cistern filled in 3 minutes
= Cistern filled

$$\left(4 \times \frac{7}{8}x + 3 \times \frac{5}{6}x\right) + 3(4+3)$$

$$= 48$$

$$6x + 21 = 48 \Rightarrow 6x = 27$$

$$x = 4.5 \text{ min.}$$

40. (a) A → 30 min — 6 units/min — (180) Total capacity
B → 36 min — 5 units/min

(Let both the pipes clogged for x
minutes) and hence full flow be-
gan after x minutes only.

According to the question:

$$\left(6 \times \frac{5}{6}x + 5 \times \frac{9}{10}x\right) + \frac{31}{2}(6+5)$$

$$= 180$$

$$5x + \frac{9}{2}x = 180 - \frac{31 \times 11}{2}$$

$$\frac{19}{2}x = \frac{19}{2}$$

$$\Rightarrow x = 1 \text{ min}$$

41. (a) A → 10 min — 3 units/min — (30) Total capacity
B → 15 min — 2 units/min

Required time by (A + B) to fill

$$\text{the tank} = \frac{30}{(3+2)} = 6 \text{ minutes}$$

According to the question:-

Water filled by the pipes (A + B) in
2 minutes

= Water emptied by the pipe C in
6 min

$\therefore$ Efficiency of the pipe C

$$= \frac{2 \times (3+2)}{6} = \frac{10}{6} \text{ units/min}$$

Required time for the pipe C to
empty the tank

$$= \frac{30 \times 6}{10} = 18 \text{ min.}$$

42. (d) A → 20 min — 3 units/min — (60) Total capacity
B → 30 min — 2 units/min

Required time by (A + B) to fill
the tank

$$= \frac{60}{(3+2)} = \mathbf{12 \text{ minutes}}$$

According to the question:-

Water filled by the pipes (A + B) in 3 minutes = water emptied by the pipe C in 12 minutes

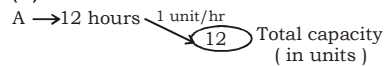
Efficiency of the pipe C

$$= \frac{3(3+2)}{12} = \frac{5}{4} \text{ units/min}$$

Required time for the pipe C to

$$\text{empty the tank} = \frac{60}{5} \times 4 = \mathbf{48 \text{ min}}$$

43. (a)



According to the question:-

$$\text{Efficiency of the leakage} = -\frac{1}{3} \text{ unit/hr}$$

Combined efficiency of (A + Leak)

$$= 1 - \frac{1}{3} = \frac{2}{3} \text{ units/hr}$$

Required time to fill the tank

$$= \frac{12 \times 3}{2} = \mathbf{18 \text{ hours}}$$

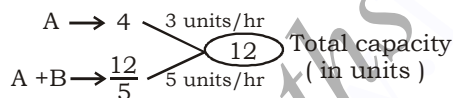
44. (b) **Note :** In such type of questions go through options to save your valuable time. Then satisfy the question conditions.

Option (b):

Let the pipe A takes least time = 4 hours

According to the question:-

A + B takes $(2.4 = \frac{12}{5})$ hours to fill the tank.



Efficiency of B = $(5 - 3) = 2$ units/hr.

Now satisfy question condition:-

Required time for A to fill the tank = 4 hours

Required time for B to fill the tank

$$= \frac{12}{2} = 6 \text{ hours}$$

$$\frac{4}{2} \times 2 + \frac{6}{3} \times 3 = \frac{5}{6} \times 12$$

$$\mathbf{10 = 10}$$

Both sides are equal so option (b) is correct.

45. (b) Efficiency of inlet and outlet tap

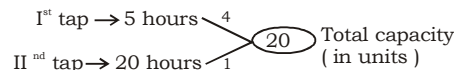
$$= \frac{25}{5} = 5 \text{ litres/min}$$

The net inflow when both pipes are opened is 5 litres/min. The outlet flow should be such that if its rate is doubled the net inflow rate should be negative or zero.

Only an option greater than or equal to '5' would satisfy this condition.

Option (b) is the only possible value.

46. (b)

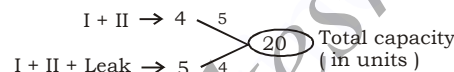


$$\text{Required time for (I + II)} = \frac{20}{(4+1)}$$

$$= 4 \text{ hours}$$

According to the question :-

When leak is open then time taken = $(4 + 1) = 5$ hours



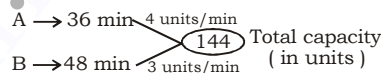
$$\text{Efficiency of the leak} = (5 - 4)$$

$$= 1 \text{ unit/hr}$$

$$\text{Required time for leak} = \frac{20}{1}$$

$$= \mathbf{20 \text{ hours}}$$

47. (b)



Let both the pipes remain jammed for x min hence full flow began after x minutes only.

$\therefore$ part of cistern filled in x min + part of cistern filled in 17 min

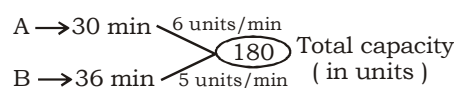
= cistern filled

$$\left(4 \times \frac{4}{5}x + 3 \times \frac{3}{5}x\right) + 17 \times 7 = 144$$

$$\frac{16x}{5} + \frac{9x}{5} = 25$$

$$\mathbf{x = 5 \text{ min}}$$

48. (a)



Let both pipes remain jammed for x min, and hence full flow began after x minutes only.

$\therefore$ part of cistern filled in x min +

part of cistern filled in $\frac{31}{2}$ min

= cistern filled

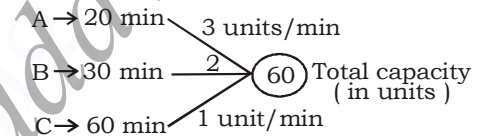
$$\left(6 \times \frac{5}{6}x + 5 \times \frac{9}{10}x\right) + \frac{31}{2} \times 11$$

$$= 180$$

$$\frac{19}{2}x = 180 - \frac{341}{2}$$

$$\frac{19}{2}x = \frac{19}{2} \Rightarrow \mathbf{x = 1 \text{ min}}$$

49. (a)



Required time for (A + B + C) to fill the tank

$$= \frac{60}{(3+2+1)} = \mathbf{10 \text{ minutes}}$$

According to the question:-

Water filled by the pipes (A + B + C) in 3 minutes = water emptied by the pipe D in 10 minutes.

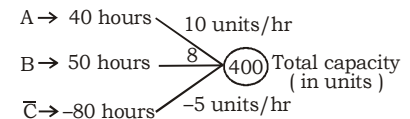
$\therefore$ Efficiency of the pipe D

$$= \frac{3 \times (3+2+1)}{10} = \frac{9}{5} \text{ units/min}$$

Required time for pipe D to empty the tank

$$= \frac{60 \times 5}{9} = \frac{100}{3} = \mathbf{33 \frac{1}{3} \text{ min}}$$

50. (a)



Till 12:00 noon water filled by the pipe A = $10 \times 5 = 50$ units

Till 12:00 noon water filled by the pipe B = $8 \times 3 = 24$ units

Total water filled = $50 + 24 = 74$ units

Remaining capacity of the tank

$$= (400 - 74) \text{ units}$$

= 326 units Now all the three pipes

(A + B + C) will work simultaneously :-

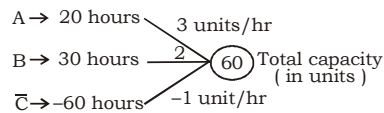
∴ Required time for $(A + B + \bar{C})$

$$= \frac{326}{(10 + 8 - 5)} = \frac{326}{13} = 25 \frac{1}{13} \text{ hrs}$$

It means the tank will be filled at

$1 \frac{1}{13}$ PM on the next day.

51. (c)



According to the question:-

Water filled by the pipe $(A + C)$ in the first hour $= (3 - 1) = 2$ units

Water filled by the pipe $(B + C)$ in the 2nd hour $= (2 - 1) = 1$ unit

Time : Capacity filled

2 hours 3 units

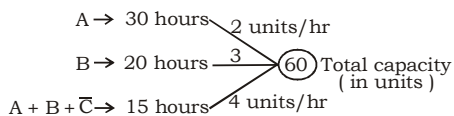
↓ × 20 ↓ × 20

[40] hours [60] units

Required time to fill the tank

= 40 hours

52. (a)



Efficiency of the pipe $C = (2 + 3) - 4$

$= 1$ unit/hr

Required time for pipe C to empty

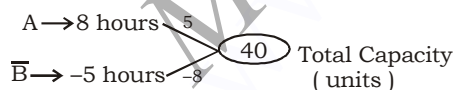
the tank $= \frac{60}{1} = 60$ hours

Capacity of the cistern

$= 60 \times 60 \times 45 = 162\,000$ litres

53. (b) Let the fill pipe and empty pipe

are A and $\bar{B}$ respectively.



$\frac{3}{4}$ th of the tank $= 40 \times \frac{3}{4}$

$= 30$ units

Required time to empty the tank

$= \frac{30}{3} = 10$ hours

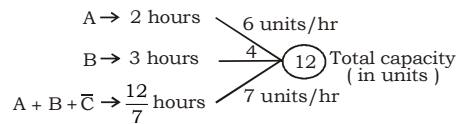
54. (b) Required time for first pipe (A) to fill whole tank

$= 1 \times 2 = 2$ hours

Required time for IInd pipe (B) to fill whole tank $= 3 \times 1 = 3$ hours

Required time for all three pipes

$(A + B + \bar{C}) = \frac{12}{7}$ hours



Efficiency of the empty pipe $(\bar{C})$

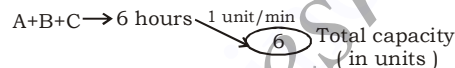
$= (6 + 4) - 7 = 3$ units/hr

[∵ $\bar{C}$ is a waste pipe]

Required time for $\bar{C}$ to empty

tank $= \frac{12}{3} = 4$ hours

55. (b)

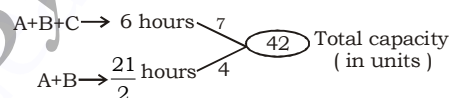


Water filled by pipes $(A + B + C)$ in 2 hours $= 2 \times 1 = 2$ units

Remaining capacity $= (6 - 2) = 4$ units

Required time for $(A + B)$ to fill the whole cistern

$= \frac{7 \times 6}{4} = \frac{21}{2}$ hours



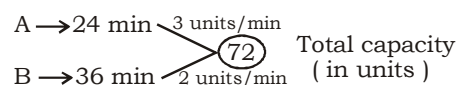
Efficiency of the pipe (C)

$= (7 - 4) = 3$ units/hr

Required time for C to empty the

tank $= \frac{42}{3} = 14$ hours

56. (a)



According to the question:

Pipe A is open for all the time.

∴ water filled by the pipe A in 20 min $= 20 \times 3 = 60$ units

Remaining capacity

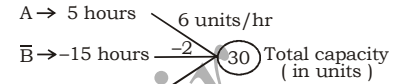
$= (72 - 60) = 12$ units

Required time for B to fill the

remaining part $= \frac{12}{2} = 6$ min

So the pipe B should be closed after 6 min.

57. (d)



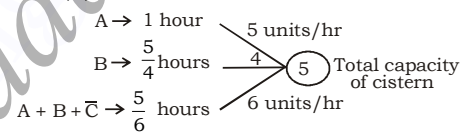
Net efficiency $= 6 - (2 + 3)$

$= 1$ unit/hour

Required time to fill the tank

$= \frac{30}{1} = 30$ hours

58. (a)



$$\left[\begin{array}{l} \therefore 75 \text{ min} = \frac{5}{4} \text{ hours} \\ 50 \text{ min} = \frac{5}{6} \text{ hours} \end{array} \right]$$

Efficiency of an outlet pipe $(\bar{C})$

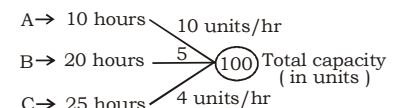
$= (5 + 4) - 6 = 3$ units/hr

Required time for outlet pipe $(\bar{C})$

to empty the tank $= \frac{5}{3}$ hours

$= \frac{5}{3} \times 60 = 100$ minutes

59. (b)



According to the question:-

Work done by all pipes $(A + B + C)$ in 2 hours

$= (10 + 5 + 4) \times 2 = 38$ units

Work done by pipes $(A + B)$ in next 2 hours

$= (10 + 5) \times 2 = 30$ units

Remaining capacity of the tank

$= 100 - (30 + 38) = 32$ units

Required time for A to the fill

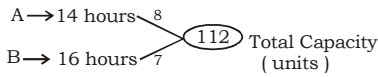
remaining part $= \frac{32}{10}$

$= 3$ hours 12 min

Total time $= 4$ hours + 3 hours

12 min $= 7$ hours 12 min

60. (a)

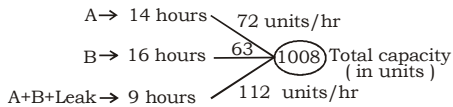


Required time for (A + B) to fill

$$\text{the cistern} = \frac{112}{15} \text{ hours}$$

$$\Rightarrow \frac{112}{15} \times 60 = 448 \text{ min}$$

Due to leak Required total time
= 448 + 92 = 540 min = 9 hours

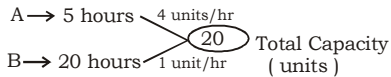


Efficiency of leak = (72 + 63) - 112 = 23 units/hr

Required time for leak to empty

$$\text{the tank} = \frac{1008}{23} = 43 \frac{19}{23} \text{ hours}$$

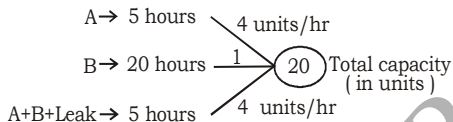
61. (b)



Required time for (A + B) to fill

$$\text{the tank} = \frac{20}{(4+1)} = 4 \text{ hours}$$

When leak is open then required time = (4 + 1) = 5 hours



Efficiency of the leak = (4 + 1) - 4 = 1 unit/hr

Required time for the leak to

$$\text{empty the tank} = \frac{20}{1} = 20 \text{ hours}$$

62. (c) The water poured by the man

$$= \frac{4}{3} \text{ litres/min}$$

The water poured by the woman

$$= \frac{3}{4} \text{ litres/min}$$

Required time to fill 200 litres of

$$\text{water} = \frac{200}{\frac{4}{3} + \frac{3}{4}} = \frac{200 \times 12}{(16+9)}$$

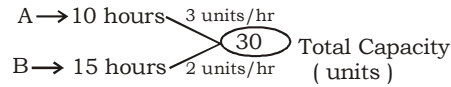
$$= 96 \text{ min} = 1 \text{ hours } 36 \text{ min}$$

63. (c) when diameter is doubled area will be four times. So it will work four times faster.

Hence Required time

$$= 40 \times \frac{1}{4} = 10 \text{ min}$$

64. (c) Let the faster and slower pipes be A and B respectively.



According to the question:

Water filled by the pipe B in 9 hours = 9 × 2 = 18 units

Remaining capacity of the tank = (30 - 18) = 12 units

Required time to fill the cistern's remaining part by pipe A

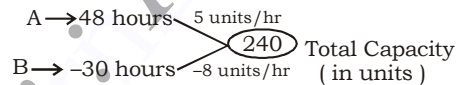
$$= \frac{12}{3} = 4 \text{ hours}$$

So the first pipe should be closed after 4 hours.

65. (b) Pipe (A) can fill the tank = 48 hours

Pipe (B) can empty it if it acts with 100 %

$$\text{Efficiency} = \frac{45}{2} \times \frac{100}{75} = 30 \text{ hr.}$$



According to the question:-

Filled part of the tank whose Capacity is two times more.

New capacity = 240 × 3 Units

$$= 240 \times 3 \times \frac{1}{4} = 180 \text{ units}$$

Now Both pipes are open

∴ Required time to empty the

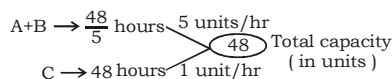
$$\text{tank} = \frac{180}{3} = 60 \text{ hours}$$

66. (a) According to the question:

Condition (I)

$$\begin{array}{lcl} \text{Time} & \rightarrow & 3 : 3 \\ \text{Efficiency} & \rightarrow & 3 : 3 \end{array}$$

Condition (II)



From condition (I) and Condition (II)

Efficiency of A = 3 units/hr

Efficiency of B = (5 - 3)

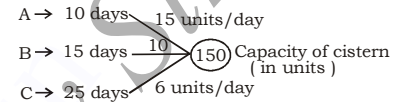
= 2 units/hr

Efficiency of C = 1 unit/hr

Required time for B to fill the tank

$$= \frac{48}{2} = 24 \text{ hours}$$

67. (d)



Time taken to fill the cistern by

$$(A + B + C) = \frac{150}{31}$$

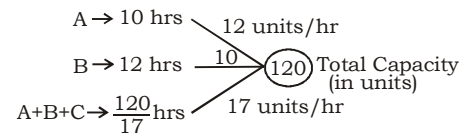
$$= 4 \frac{26}{31} \text{ hours}$$

$$= 4 \text{ hours } \left(\frac{26}{31} \times 60 \right)$$

= 4 hours 50 min (Apprx.)

So cistern will be full at 11:50 am

68. (d) Hence cistern will full at 11:50 am,



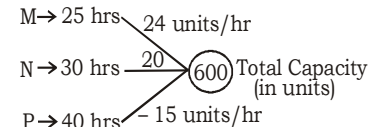
Efficiency of leakage (C)

= 17 - (10 + 12) = - 5 units/hr

Hence the time taken to empty the full tank by C

$$= \frac{120}{5} = 24 \text{ hours}$$

69. (a)



In the starting 5 hours the pipes (M + N + P) will fill

= 5 × (20 + 24 - 15) = 145 units

Now Remaining units to be filled by (M + N)

= (600 - 145) = 455 units

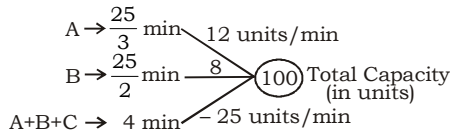
Time taken by (M + N)

$$= \frac{455}{44} = 10 \frac{15}{44} \text{ hrs.}$$

Required time to fill the tank

$$= 10 \frac{15}{44} \text{ hours}$$

70. (a)



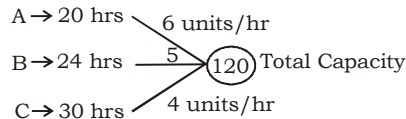
Hence efficiency of emptying pipe
= - 45 units/minute

Time taken by this to empty the
tank = $\frac{100}{45}$ minutes.

$$\text{Capacity of tank} = \frac{100}{45} \times 162$$

$$= \mathbf{360 \text{ litres}}$$

71. (d)



No. of units filled in first 2 hours
= 6 + (6+5) = 17 units

Remaining units will be filled by
pipes (A+B+C).

Remaining capacity

$$= (120 - 17) = 103 \text{ units}$$

$$\text{Required time} = \frac{103}{15} = 6 \frac{13}{15} \text{ hours}$$

Total required time

$$= 2 + 6 \frac{13}{15} = \mathbf{8 \frac{13}{15} \text{ hours}}$$

72. (a) A : B : C

$$\text{Radius} \quad 2 : \frac{5}{3} : 4$$

$$4 : \frac{25}{9} : 16$$

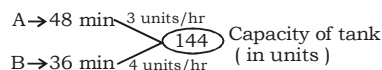
Ratio of efficiencies 36 : 25 : 144

Time taken by all the three pipes
to fill the tank

$$= \frac{144 \times 25}{(36 + 25 + 144)} = \frac{720}{41}$$

$$= \mathbf{17 \frac{23}{41} \text{ min}}$$

73. (c)



Since Pipe B is open for all $25 \frac{1}{2}$
minutes.

Hence part filled by pipe B

$$= 4 \times 25 \frac{1}{2} = 102 \text{ units}$$

Part filled by pipe A

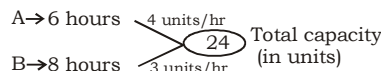
$$= (144 - 102) = 42 \text{ units}$$

$$\text{Time taken by A} = \frac{42}{3}$$

= 14 minutes.

Hence A was closed at 8 : 14 am.

74. (c)



According to the question:-
Water filled by both pipes

$$(A + B) \text{ in } \frac{5}{2} \text{ hours}$$

$$= \frac{5}{2} \times (4 + 3) = \frac{35}{2} \text{ units}$$

Remaining capacity

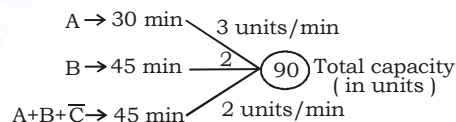
$$= 24 - \frac{35}{2} = \frac{13}{2} \text{ units}$$

Required time for A to fill the
remaining capacity of the tank

$$= \frac{13}{2 \times 4} = \frac{13}{8} \text{ hours}$$

$$\text{Total time} = \frac{5}{2} + \frac{13}{8} = \mathbf{4 \frac{1}{8} \text{ hrs}}$$

75. (a)



Efficiency of the tap $\bar{C}$

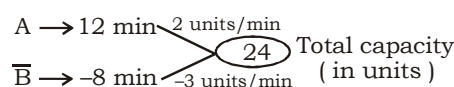
$$= (3 + 2) - 2 = 3 \text{ units/min.}$$

Note: Remember $\bar{C}$ is an
exhaust pipe.

Required time for $\bar{C}$ to empty the

$$\text{tank} = \frac{90}{3} = \mathbf{30 \text{ min}}$$

76. (b)



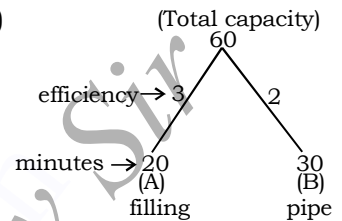
Pipe $\bar{B}$ is a negative pipe.

According to the question :

Water filled by pipe A in 6 min
= $2 \times 6 = 12$ units

Now both pipes are open then,
required time to empty the cistern
= $12/1 = 12$ minutes

77. (b)



According to the questions,
Pipe 'A' is closed after some time.
and Tank is filled in 18 minutes
so B started filling in the begin-
ning and worked till the last i.e
18 minutes

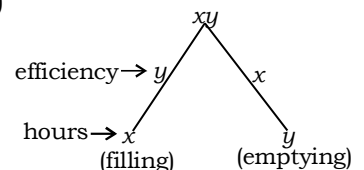
So, $2 \times 18 = 36$ units is filled

Work left = $60 - 36 = 24$ units

These 24 units must be filled by
Pipe A in beginning.

$$24 \text{ It can fill it in } \frac{24}{3} = 8 \text{ minutes}$$

78. (d)



Total efficiency of both the pipes
is $(y - x)/\text{hr}$

Tank will be filled in

$$= \frac{xy}{y - x} \text{ hrs}$$

79. (c) Apply formula

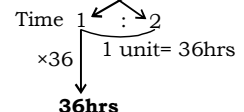
$$\frac{m_1 d_1 h_1}{w_1} = \frac{m_2 d_2 h_2}{w_2}$$

Let 'P' pumps are required to
empty the reservoir.

$$\frac{12 \text{ pumps} \times 6 \text{ hours} \times 15 \text{ days}}{1 \text{ reservoir}} = \frac{P \times 9 \text{ hours} \times 12 \text{ days}}{1 \text{ reservoir}}$$

$$P = \mathbf{10 \text{ pumps}}$$

80. (a) Pipe A : Pipe A-leakage
efficiency → 2 : 1



81. (d) Let (A + B) fills 1 litre in 1 minute
then (A + B) fills in 36 minutes
According to the question
(A+B) work only 30 minutes
then pipe filled by (A+B) in 30
minutes is = 30 litres
remaining part = 6 litres
6 litres part filled by A in = 10
minutes

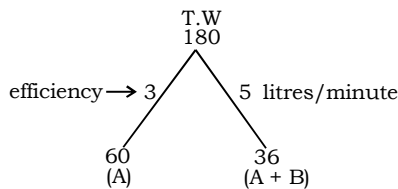
$$1 \text{ part filled by A} = \frac{10}{6} \text{ minutes}$$

$$36 \text{ parts filled by A} = \frac{10}{6} \times 36$$

$$= 60 \text{ minutes}$$

$$A + B = 36 \text{ minutes}$$

$$A = 60 \text{ minutes}$$

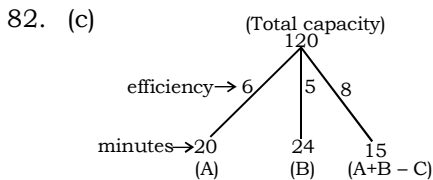


$$A's \text{ efficiency} = 3 \text{ litres/minutes}$$

$$B's \text{ efficiency} = 2 \text{ litres/minutes.}$$

$$B \text{ can alone fill the tank in}$$

$$= \frac{T.C}{\text{eff. of B}} = \frac{180}{2} = \mathbf{90 \text{ minutes}}$$



$$(A+B-C) \text{ one day work} = 8$$

$$6 + 5 - C = 8$$

$$11 - C = 8$$

$$C = 11 - 8$$

$$C = 3$$

$$C = 3 \text{ units}$$

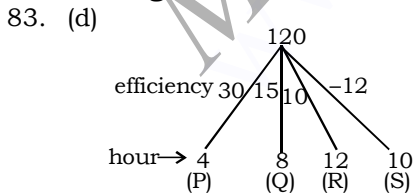
$$T.C = 120$$

$$\times 1$$

$$\times 1$$

Actual emptying capacity

$$= \mathbf{120 \text{ gallons}}$$



In order to fill the cistern in less time.

So efficiency of filling should be more

Now, check all options.

$$(A) \rightarrow Q \text{ efficiency} = 15 \text{ units/hr}$$

$$(B) \rightarrow (P + R - S) \text{ efficiency}$$

$$= 30 + 10 - 12 = 28 \text{ units/hr}$$

$$(C) \rightarrow (P + S) \text{ efficiency}$$

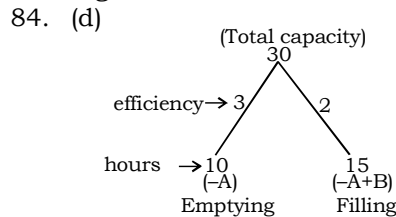
$$= 30 - 12 = 18 \text{ units/hr}$$

$$(D) \rightarrow (P + Q - S) \text{ efficiency}$$

$$= 30 + 15 - 12 = 33 \text{ units/hr}$$

Option 'D' is answer.

Since efficiency of option 'D' is highest.



Pipe A is emptying at 3 units/hr

When filling pipe 'B' start function then emptying rate comes down to 2 units/hr

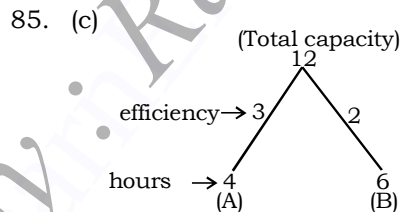
So filling pipe efficiency is $(3 - 2) = 1 \text{ unit/hr}$

$$\text{Pipe 'B' will fill tank in} = \frac{30}{1} = 30 \text{ hrs}$$

Filling rate is 4 litres/minutes

It will fill $4 \times 60 = 240 \text{ litres/hr.}$

$$\text{Total capacity} = 240 \times 30 = \mathbf{7200 \text{ litres}}$$



A will fill 3 units of water in Ist hour

B will fill 2 units of water in IInd hour

5 units are filled in 2 hours

$$\times 2$$

$$\times 2$$

$$10 \text{ units}$$

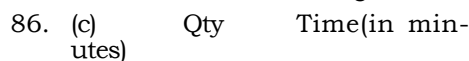
$$4 \text{ hours}$$

$$\text{Work left} = 12 - 10 = 2 \text{ units}$$

Now, A will begin and it completes

$$2 \text{ units in } \frac{2}{3} \text{ hours}$$

$$\text{Total time} = 4 + \frac{2}{3} = \mathbf{4 \frac{2}{3} \text{ hours}}$$

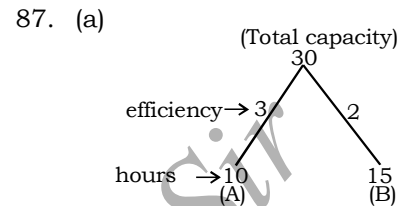


$$\text{Boy} \rightarrow (43) \times 4 = 16 \text{ litres in 12 min}$$

$$\text{Girl} \rightarrow (34) \times 3 = 9 \text{ litres in 12 min}$$

(Boy + Girl) pour

$$\begin{array}{cc} 25 \text{ litres} & 12 \text{ minutes} \\ \times 4 \downarrow & \times 4 \downarrow \\ 100 \text{ litres} & \mathbf{48 \text{ minutes}} \end{array}$$

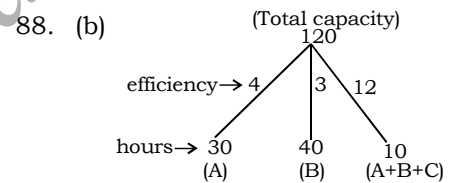


efficiency of both pipes

$$= 3 + 2 = 5 \text{ units/hrs}$$

They both will fill the tank in

$$\frac{T.C}{\text{Efficiency}} = \frac{30}{5} = \mathbf{6 \text{ hours}}$$

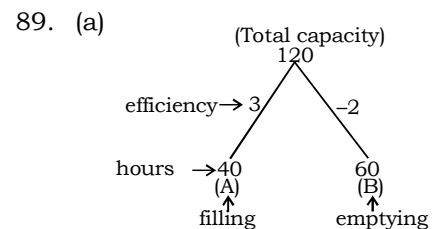


$$C's \text{ efficiency} = \text{efficiency of } (A + B + C) - \text{efficiency of } (A + B)$$

$$= 12 - (4 + 3) = 5 \text{ units/minutes}$$

C can fill the cistern alone in

$$\frac{T.C}{\text{Efficiency of C}} = \frac{120}{5} = 24 \text{ minutes}$$



Total unit of water filled is

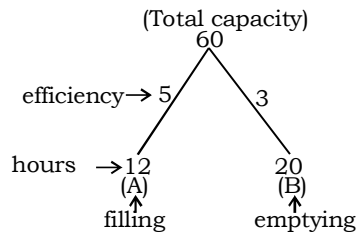
$$= 3 - 2 = 1 \text{ unit/min}$$

$$\text{Tank will be filled in} = \frac{120}{1}$$

$$= \mathbf{120 \text{ minutes}}$$

Tank will be filled in 120 minutes = **2 hrs**

90. (c) If emptying pipe empty half the tank in 10 hrs then emptying pipe empty full tank in $10 \times 2 = 20 \text{ hrs}$

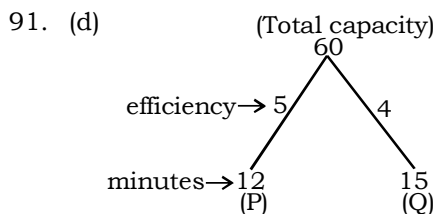


(A-B) efficiency
= 5 - 3 = 2 units/h

$$\Rightarrow \frac{1}{2} \text{ of T.C}$$

$$\Rightarrow \frac{1}{2} \text{ unit/s}$$

$$\Rightarrow \frac{30}{2} = \mathbf{15 \text{ hrs}}$$



(P + Q) efficiency = (5 + 4)

= 9 units/minutes

(P + Q) fill in 3 minutes

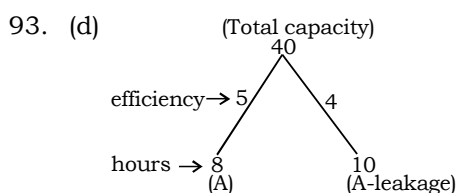
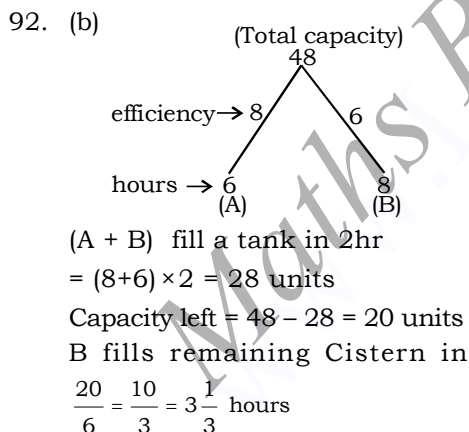
= 9 × 3 = 27 units

Capacity left = 60 - 27 = 33 units

Q fill remaining cistern in

$$\frac{\text{T.C}}{\text{Efficiency of Q}}$$

$$= \frac{33}{4} = 8\frac{1}{4} \text{ minutes}$$



A's efficiency = 5 units/hr

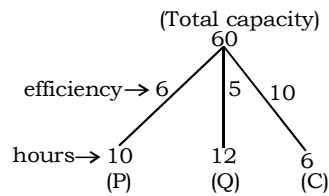
A's efficiency after leakage

∴ Leakage = 1 unit/hr

Leakage empty the whole cistern

$$\text{in } \frac{40}{1} = 40 \text{ hours}$$

94. (b)



(P + Q) fills (6 + 5) = 11 units/hr

C empties = 10 units/hr

If all pipes are open

So, only 11 - 10 = 1 unit of water

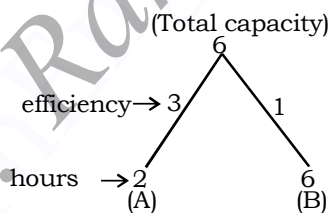
can be filled in tank $\frac{1}{4}$ of tank
will be filled in

$$\frac{\text{T.C}}{\text{Efficiency}} = \frac{\left(\frac{1}{4} \times 60\right)}{1}$$

$$= \frac{15}{1} = 15 \text{ hrs}$$

$$= 7 \text{ am} + 15 \text{ hr} = \mathbf{10 \text{ pm}}$$

95. (c)



Pipe A will fill 3 units till 11 am

capacity left = 6 - 3 = 3 units

Now both pipes will fill and they will take

$$\frac{\text{T.C}}{\text{Efficiency}} = \frac{3}{(3+1)} = \frac{3}{4} \text{ hours}$$

$$\text{So, } \left(11 + \frac{3}{4}\right) \text{ am, tank will be filled}$$

$$= \mathbf{11 : 45 \text{ A.M}}$$

96. (a) Let total capacity of cistern is 5 units

filled part of the cistern

$$= 5 \text{ units} \times \frac{3}{5} = 3 \text{ units}$$

Rest part of the cistern = 5 - 3

= 2 units

3 units filled in = 60 sec.

$$1 \text{ unit filled in} = \frac{60}{3}$$

$$2 \text{ units filled in} = \frac{60}{3} \times 2 = 40 \text{ sec.}$$

97. (c) Volume of cistern = $\pi r^2 h$

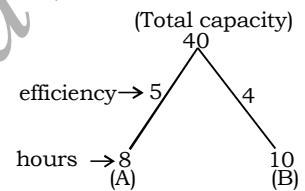
$$\pi r^2 \times h = 11000 \text{ cm}^3$$

$$\frac{22}{7} \times \frac{25}{2} \times \frac{25}{2} \times h = 11000 \text{ cm}^3$$

$$h = \frac{11000 \times 7 \times 2 \times 2}{22 \times 25 \times 25}$$

$$h = \frac{28 \times 4}{5} = \frac{112}{5} = 22\frac{2}{5} \text{ cm}$$

98. (a)



(A+B)'s one hour filling (A + B)

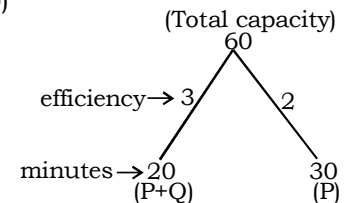
= 9 unit

(A+B)'s 4 hour filling (A+B) = 9 × 4

= 36 units

$$\text{Part of tank filled} = \frac{36}{40} = \frac{9}{10}$$

99. (b)



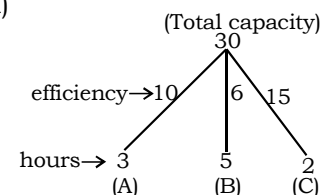
Efficiency of Q

= (efficiency of P+Q - efficiency of P) = (3-2) = 1 units

Q can alone fill cistern in

$$\frac{\text{T.C}}{\text{efficiency}} = \frac{60}{1} = \mathbf{60 \text{ minutes}}$$

100. (d)



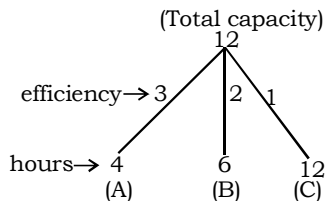
If all pipes are open efficiency of filling/hour is

= efficiency of A + B - efficiency of C = (10 + 6) - 15 = 1 unit/hr

1 unit is filled in 1 hr

30 units is filled in 1 × 30 = **30 hrs**

101. (a)



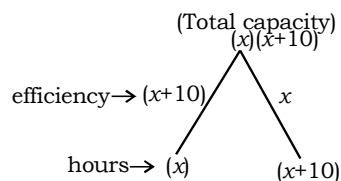
(A+B+C)'s efficiency = 3+2+1

= 6 units/hr

(A+B+C) can fill the tank in

$$= \frac{\text{T.C}}{\text{Efficiency of (A+B+C)}} = \frac{12}{6} = \mathbf{2 \text{ hrs}}$$

102. (a) Always try to solve these question by options to save time.



$$= \frac{(x) \times (x+10)}{(x+10) + x} = \text{total time taken}$$

by both pipe

Now take out one option and put it in place of 'x'

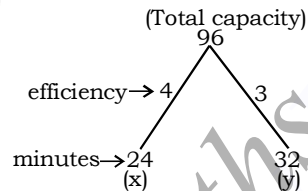
⇒ $x = 20$ (from option (a))

$$\frac{(20) \times (20+10)}{(20+10) + (20)} = \frac{20 \times 30}{50} = 12 \text{ hrs}$$

It matches with question figure.

Total time matches. So this is answer 20 hrs

103. (b)



If tank is to full in 18 minutes so pipe 'x' will work for these 18 minutes

Pipe 'x' fills in 18 minutes = $18 \times 4 = 72$ units

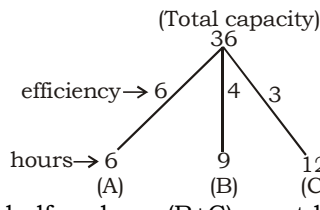
Capacity left = $96 - 72 = 24$ units

So left capacity of tank/cistern must be filled by pipe 'y'

pipe y fills in $\frac{24}{3} = 8$ mins

So, after 8 minutes it must have closed.

104. (c)



In half an hour (B+C) must have

$$\text{filled} = \frac{4}{2} + \frac{3}{2} = \frac{7}{2} \text{ units}$$

$$\text{Capacity left} = 36 - \frac{7}{2} = \frac{65}{2} \text{ units}$$

Now, all pipes will fill the remaining tank

$$= \frac{65}{2 \times (6 + 4 + 3)} = \frac{65}{2 \times 13} = \frac{5}{2}$$

$$= \mathbf{2 \frac{1}{2} \text{ hrs}}$$

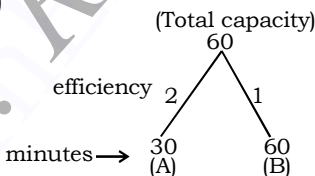
105. (a) Flow of water depend upon

	Pipe 1	Pipe 2	Pipe 3
Diameter →	60	30	20
radius →	30	15	10
$\pi (30)^2$	900π	225π	100π

unit of water they can flow ($\propto r^2$)	900	225	100
No. of pipes	$\frac{1}{900}$	$\frac{2}{450}$	$\frac{3}{300}$
Total water flow			

So pipe 1 with diameter 60 is fastest

106. (d)



(A+B)'s filling (2+1) = 3 units/min

In 5 minutes, they will fill $3 \times 5 = 15$ units

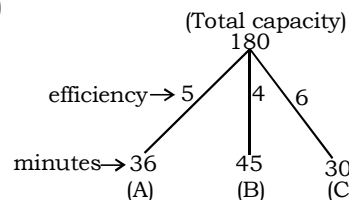
Capacity left = $60 - 15 = 45$ units

Second pipe (B) fills it in

$$\frac{\text{T.C}}{\text{efficiency of B}} = \frac{45}{1}$$

$$= \mathbf{45 \text{ minutes}}$$

107. (b)



(A + B)'s 7 minutes filling (A+B) = $(5+4) \times 7 = 63$ units

Capacity left = $180 - 63 = 117$ units

Now C is opened, it empties by 6 units/min.

So total units filled in tank is

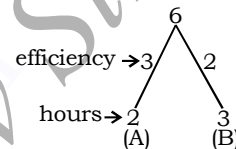
$$= (5+4) \times 7 = 63 \text{ units}$$

Now tank can be filled in

$$= \frac{117}{3} = 39 \text{ min.}$$

Tank is filled up in = $7 + 39$ minutes = **46 min.**

108. (a)



(A+B) fill tank in (A + B)

$$= \frac{\text{T.C}}{\text{Efficiency of (A+B)}} = \frac{6}{3+2} = 1 \frac{1}{5}$$

$$= \mathbf{1 \text{ hour } 12 \text{ min}}$$

109. (d) 1 sec → 1 drop

No of second in 300 days.

$$(24_{\text{hrs}} \times 60_{\text{mins}} \times 60_{\text{sec}}) \times 300 \text{ days}$$

No of litres wasted

$$100 \times \frac{24 \times 60 \times 60 \times 300}{600}$$

$$= 43200 \times 100 = 4320000 \text{ ml}$$

$$= \frac{4320000}{1000} = 4320 \text{ litres}$$

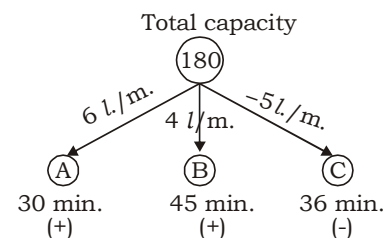
110. (b)

$$\left[\frac{m_1 \times h_1 \times T_1}{W_1} = \frac{m_2 \times h_2 \times T_2}{W_2} \right]$$

$$9_{\text{taps}} \times 20_{\text{mins}} = T_{\text{taps}} \times 15_{\text{mins}}$$

$$T = \mathbf{12 \text{ Taps}}$$

111. (b)



A (+) 30 minutes

B (+) 45 minutes

C (-) 36 minutes

⇒ Filled water by (A+B) in 12 min = $12 \times (6+4)$

$$= 12 \times 10 = 120 \text{ litre}$$

⇒ Remaining capacity

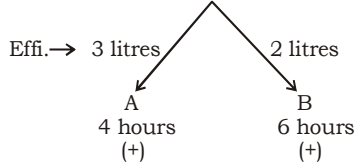
$$= 180 - 120 = 60 \text{ litre}$$

- ⇒ After 12 min. emptied pipe C is also opened
- ⇒ Total capacity (A + B - C)
= (6 + 4 - 5) = 5 L/m.
- ⇒ Time taken by (A + B - C) with capacity 5 L/m.
to fill the remaining part (5 L/m).
- $$= \frac{60 \text{ L.}}{5 \text{ L./m.}} = 12 \text{ min.}$$
- ⇒ Therefore, total time which the tank will be filled up is
= 12 + 12 = 24 minutes.

112. (b) A → 4 hours

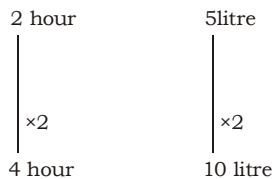
B → 6 hours

LCM → 12 litres → Total Capacity



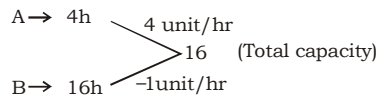
According to the question

- ⇒ For the first hour tap A is opened and B for second hour
- ⇒ Work done by both in 2 hours
→ 3l/h + 2l/h



- ⇒ Remaining part = 12 - 10 = 2 litre
- ⇒ Again in 5th hour A will be opened
Tap A will fill 2 litre water with its efficiency = $\frac{2}{3}$
- ⇒ Therefore tank will be filled in
= $\left(4 + \frac{2}{3}\right)$ hours = $4\frac{2}{3}$ hours.

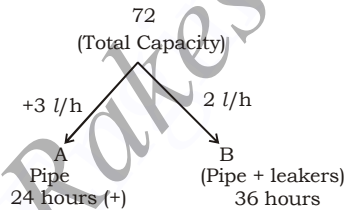
113. (d) According to the question,



A & B one hour work (4 - 1) = 3 units

A & B complete in = $\frac{16}{3} = 5\frac{1}{3}$ hours

114. (c)



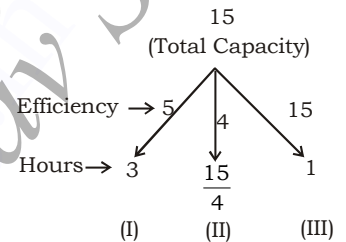
According to the Question,
Efficiency of leakage
= 3 - 2 = 1 L/h

Half capacity = $\frac{72}{2} = 36$ liters

Time taken by leakage to empty the Half filled tank

= $\frac{36 \text{ litre}}{1 \text{ litre/h}} = 36$ hours

115. (c)



Ist pipe fills till 3pm = 5 × 2 = 10 units

IInd pipe fills till 3pm = 4 × 1 = 4 units

Total filling = 10 + 4 = 14 units

Net Pipe (III) efficiency = 15 - 9

= 6 units/hrs

Tank will be



TIME, DISTANCE & TRAIN

The terms Time and Distance are related to the speed of a moving object.

Speed: We define the speed of an object as the distance covered by it in a unit time interval. It is obtained by dividing the distance covered by the object in the time it takes to cover that distance.

Thus,

$$\text{Speed} = \frac{\text{Distance travelled}}{\text{Time taken}}$$

SOME BASIC FORMULAE

1. $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$
2. $\text{Distance} = \text{Speed} \times \text{Time}$
3. $\text{Time} = \frac{\text{Distance}}{\text{Speed}}$

Units of Measurement

Generally, if the distance is measured in kilometre, we measure time in hour and speed in kilometre per hour and is written as km/h and if the distance is measured in metre then time is taken in second and speed in metre per second and is written as m/s.

Conversion of Units

One kilometre/hour

$$= \frac{1000 \text{ metre}}{60 \times 60 \text{ Seconds}} = \frac{5}{18} \text{ m/s}$$

$$\therefore \text{One metre/second} = \frac{18}{5} \text{ km/h}$$

$$\text{Thus, } x \text{ km/h} = \left(x \times \frac{5}{18} \right) \text{ m/s}$$

$$\text{and, } x \text{ m/s} = \left(x \times \frac{18}{5} \right) \text{ km/h}$$

Important Things to Remember

1. (a) If A covers a distance d_1 km at S_1 km/h and then d_2 km at S_2 km/h, then the average speed during the whole journey is given by

Average speed

$$= \frac{s_1 s_2 (d_1 + d_2)}{s_1 d_2 + s_2 d_1} \text{ km/h}$$

(b) If A goes from X to Y at S_1 km/h and comes back from Y to X at S_2 km/h, then the average speed during the whole journey is given by

$$\text{Average speed} = \frac{2s_1 s_2}{s_1 + s_2}$$

EXPLANATION

- (a) Time taken to travel d_1 km at S_1 km/h is

$$t_1 = \frac{d_1}{s_1} h$$

Time taken to travel d_2 km at S_2 km/h is

$$t_2 = \frac{d_2}{s_2} h$$

Total time taken

$$= t_1 + t_2 = \left(\frac{d_1}{s_1} + \frac{d_2}{s_2} \right) h$$

$$\left(\frac{s_1 d_2 + s_2 d_1}{s_1 s_2} \right) h$$

Total distance covered

$$= (d_1 + d_2) \text{ km. Therefore,}$$

Average speed

$$= \frac{\text{Total distance covered}}{\text{Total time taken}}$$

$$= \frac{s_1 s_2 (d_1 + d_2)}{s_1 d_2 + s_2 d_1} \text{ km/h} \quad \dots (i)$$

- (b) Let the distance from X to Y be d km.

Take $d_1 = d_2 = d$ in (i), we get

Average speed

$$= \frac{2ds_1 s_2}{d(s_1 + s_2)} = \frac{2s_1 s_2}{s_1 + s_2}$$

2. If a body travels $d_1, d_2, d_3, \dots, d_n$ metres with different speeds $s_1, s_2, s_3, \dots, s_n$ m/sec in time $T_1, T_2, T_3, \dots, T_n$ seconds respectively, then the average speed of the body throughout the journey is given by

$$V_a = \frac{\text{Total distance travelled}}{\text{Total time taken}}$$

$$= \frac{d_1 + d_2 + d_3 + \dots + d_n}{T_1 + T_2 + T_3 + \dots + T_n}$$

[If $d_1, d_2, \dots, d_n$ and $T_1, T_2, \dots, T_n$ are known]

and,

$$V_a = \frac{s_1 T_1 + s_2 T_2 + s_3 T_3 + \dots + s_n T_n}{T_1 + T_2 + T_3 + \dots + T_n}$$

[If $T_1, T_2, \dots, T_n$ and $s_1, \dots, s_n$ are known]

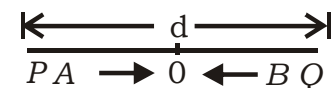
3. If two persons A and B start at the same time from two points P and Q towards each other and after crossing they take T_1 and T_2 hours in reaching Q and P respectively, then

$$\frac{A's \text{ speed}}{B's \text{ speed}} = \frac{\sqrt{T_2}}{\sqrt{T_1}}$$

Explanation

Let the total distance between P and Q be d km.

Let the speed of A be s_1 km/h and that of B be s_2 km/h.



Since they are moving in opposite directions, their relative speed is $(s_1 + s_2)$

$$\text{They will meet after } \left(\frac{d}{s_1 + s_2} \right) h$$

Distance travelled by A in



$$\left(\frac{d}{s_1 + s_2}\right)h = PO = \left(\frac{ds_1}{s_1 + s_2}\right)km$$

Distance travelled by B in $\left(\frac{d}{s_1 + s_2}\right)h$

$$= QO = \left(\frac{ds_2}{s_1 + s_2}\right)h$$

$$= QO = \left(\frac{ds_2}{s_1 + s_2}\right)km$$

$$= T_1 \text{ (given).} \dots\dots(i)$$

Time taken by B to travel PO

$$= \left(\frac{ds_1}{s_1 + s_2}\right) \frac{1}{s_1}$$

$$T_2 \text{ (given)} \dots\dots(ii)$$

Dividing equation (ii) by equation (i), we get

$$\frac{s_1 / s_2}{s_2 / s_1} = \frac{T_2}{T_1}$$

$$\text{or, } \left(\frac{s_1}{s_2}\right)^2 = \frac{T_2}{T_1} \text{ or, } \frac{s_1}{s_2} = \sqrt{\frac{T_2}{T_1}}$$

$$\therefore \frac{A's \text{ speed}}{B's \text{ speed}} = \frac{\sqrt{T_2}}{\sqrt{T_1}}$$

4. If the new speed is $\frac{a}{b}$ of the original speed, then the change in time taken to cover the same distance is given by

$$\text{Change in time} = \left(\frac{b}{a} - 1\right) \times \text{original time}$$

5. A body covers a distance d in time T_1 with speed S_1 , but when it travels with speed S_2 it covers the same distance in time T_2

The following relations hold

$$= \frac{\text{product of speed}}{d} = \frac{s_1 - s_2}{T_2 - T_1}$$

$$= \frac{\text{Difference of speed}}{\text{Difference of time}}$$

Equating any two of the above, we can find the unknowns as per the given question.

EXAMPLE

1. Ramesh crosses a street 600 m long in 5 minutes. His speed in km/h is.

$$\text{Sol. Speed} = \frac{\text{Distance travelled}}{\text{Time taken}}$$

$$= \left(\frac{600}{5 \times 60}\right) \text{ m/s}$$

$$= \left(\frac{600}{5 \times 60} \times \frac{18}{5}\right) \text{ km/h}$$

$$= 7.2 \text{ km/h}$$

2. Mohan covers 10.2 km in 3 hours, the distance covered by him in 5 hours is

Sol. Mohan's speed

$$= \left(\frac{10.2}{3}\right) \text{ km/h} = 3.4 \text{ km/h}$$

$\therefore$ Distance covered by him in 5 hours

$$= (3.4 \times 5) \text{ km} = 17 \text{ km}$$

Alternate

$$3 \text{ units} \longrightarrow 10.2$$

$$1 \text{ unit} \longrightarrow \frac{10.2}{3}$$

$$5 \text{ units} \longrightarrow \frac{10.2}{3} \times 5 = 17$$

$\therefore$ Distance covered by him in 5 hours = 17 km

3. A ship sails to a certain city at the speed of 20 knots/h and sails back to the same point at the rate of 30 knots/h. What is the average speed for the whole journey?

Sol. Here, $s_1 = 20$ and $s_2 = 30$

$\therefore$ Average speed

$$= \frac{2s_1 s_2}{s_1 + s_2} = \frac{2 \times 20 \times 30}{20 + 30}$$

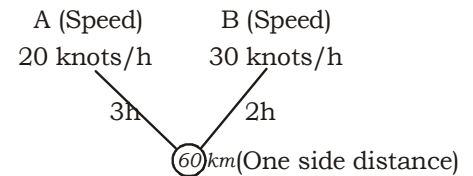
$$= 24 \text{ knots/h}$$

Alternate

Speed A = 20 knots/h

Speed B = 30 knots/h

To know the one side of a distance we take the L.C.M of speed 'A' and speed 'B'



$\therefore$ Total distance covered

$$= 2 \times 60 = 120 \text{ km}$$

$$\text{Average speed} = \frac{\text{Distance travelled}}{\text{Time taken}}$$

$$= \frac{120}{(3+2)} = \frac{120}{5}$$

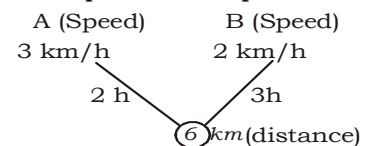
$$= 24 \text{ knots/h}$$

4. A boy goes to school at the speed of 3 km/h and returns at the speed of 2 km/h if he takes 5 hours in all, find the distance in kilometre between the village and the school.

Sol. Speed A = 3 km/h

Speed B = 2 km/h

To know the distance we take the L.C.M of speed A and speed B



$\therefore$ In this time taken by the boy is 5 hr and in our question time is also given 5 hr, therefore both times are equal

$\therefore$ Distance = 6 km

5. A and B are two towns. A car goes from A to B at a speed of 64 km/h and returns to A at a slower speed. If its average speed for the whole journey is 56 km/hr, it returned with what speed?

Sol. Let the speed for the return journey be x km/h

$$\text{Then, } 56 = \frac{2s_1 s_2}{s_1 + s_2} = \frac{2 \times 64 \times x}{64 + x}$$

$$\Rightarrow 7(64 + x) = 16x \text{ or } 9x = 448$$

$$\therefore x = \frac{448}{9} = 49.78 \text{ km/h}$$

6. A bicycle rider covers his onward journey from A to B at 10 km/h and during the return journey from B to A he covers the same distance at 8 km/h. if he finishes the onward and

return journey in $4\frac{1}{2}$ hours, then

the total distance covered by him during the entire journey is



Sol. Here, $s_1 = 10$ and $s_2 = 8$

$$\therefore \text{Average speed} = \frac{2s_1s_2}{s_1 + s_2}$$

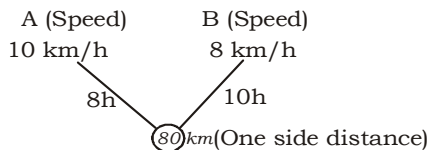
$$= \frac{2 \times 10 \times 8}{10 + 8} = \frac{80}{9} \text{ km/h}$$

Total time taken for the entire journey = $\frac{9}{2}$ hours

$\therefore$ Total distance covered = Average speed $\times$ total time

$$\text{taken} = \frac{80}{9} \times \frac{9}{2} = 40 \text{ km}$$

Alternate



$\therefore$ Total distance covered = $2 \times 80 = 160 \text{ km}$

In 18 hours distance covered = 160 km

In 1 hour distance covered

$$= \frac{160}{18} \text{ km}$$

In $4\frac{1}{2}$ hours distance covered

$$= \frac{160}{18} \times \frac{9}{2} = 40 \text{ km}$$

$\therefore$ Distance = 40 km

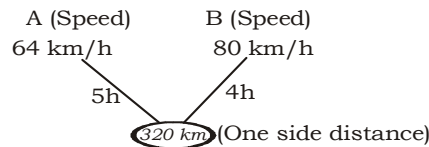
7. Once in a tour a man travels at the rate of 64 km an hour for the first 160 km, then travels the next 160 km at the rate of 80 km an hour. The average speed in km per hour for the first 320 km of the tour is ?

Sol. Here, $s_1 = 64$ and $s_2 = 80$

$\therefore$ Average speed

$$= \frac{2s_1s_2}{s_1 + s_2} = \frac{2 \times 64 \times 80}{64 + 80} = 71.11 \text{ km/h}$$

Alternate



Total distance travelled

$$= 2 \times 320 = 640 \text{ km}$$

Average speed

$$= \frac{\text{Total distance}}{\text{Total time}} = \frac{640}{9}$$

$$= 71.11 \text{ km/h}$$

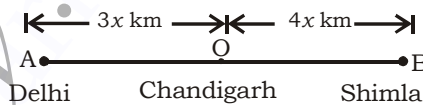
8. Shyam went from Delhi to Shimla via Chandigarh by car. The distance from Delhi to

Chandigarh is $\frac{3}{4}$ times the distance from Chandigarh to Shimla. The average speed from

Delhi to Chandigarh is $\frac{3}{2}$ times the average speed from to Chandigarh to Shimla. If the average speed for the entire journey was 49 km/h, what was the average speed from Chandigarh to Shimla?

Sol.

$$\frac{\text{Avg. Speed Delhi to Chandigarh}}{\text{Avg. Speed Chandigarh to Shimla}} = \frac{3y}{2y}$$



Time taken from Chandigarh to

$$\text{Shimla} = \frac{4x}{2y} = \frac{2x}{y} \text{ hour}$$

Time taken from Delhi to

$$\text{Chandigarh} = \frac{3x}{3y} = \frac{x}{y} \text{ hour}$$

Given: average speed from

$$\text{Delhi to Shimla} = \frac{7x}{\frac{x}{y} + \frac{2x}{y}} = 49$$

$$\Rightarrow y = 21 \text{ km/h.}$$

Hence, average speed from Chandigarh to Shimla = $21 \times 2 = 42 \text{ km/h}$

9. A car during its journey travels 40 minutes at a speed of 30 km/h, another 50 minutes at a speed of 60 km/h and 1 hour at a speed of 30 km/h. Find the average speed of the car ?

Sol. Here, $T_1 = \frac{40}{60}$, $T_2 = \frac{50}{60}$, T_3

$$= 1, s_1 = 30,$$

$$s_2 = 60, s_3 = 30$$

Average speed of the car

$$= \frac{s_1T_1 + s_2T_2 + s_3T_3}{T_1 + T_2 + T_3}$$

$$= \frac{30 \times \frac{40}{60} + 60 \times \frac{50}{60} + 30 \times 1}{\frac{40}{60} + \frac{50}{60} + 1}$$

$$= 40 \text{ km/h}$$

10. A man walks 6 km at a speed of

$1\frac{1}{2}$ km/hr, runs 8 km at a speed

of 2 km/h and goes by bus another 32 km. Speed of the bus is 8 km/hr. If the speed of the bus is considered as the speed of the man, find the average speed of the man?

Sol. Here, $x_1 = 6$, $x_2 = 8$, $x_3 = 32$,

$$s_1 = \frac{3}{2}$$

$$s_2 = 2 \text{ and } s_3 = 8$$

$\therefore$ Average speed of the man

$$= \frac{x_1 + x_2 + x_3}{\frac{x_1}{s_1} + \frac{x_2}{s_2} + \frac{x_3}{s_3}}$$

$$= \frac{6 + 8 + 32}{\frac{6}{3/2} + \frac{8}{2} + \frac{32}{8}}$$

$$= \frac{46}{12} = 3\frac{5}{6} \text{ km/h}$$

11. Nikita starts her journey from Delhi to Bhopal and simultaneously Nishita starts from Bhopal to Delhi. After crossing each other they finish

their remaining journey in $5\frac{4}{9}$ hours and 9 hours, respectively. What is Nishita's speed if Nikita's speed is 36 km/h?



Sol. $\frac{\text{Nikita's speed}}{\text{Nishita's speed}} = \sqrt{\frac{T_2}{T_1}}$

$$= \frac{\sqrt{9}}{\sqrt{5 \frac{4}{9}}} = \frac{\sqrt{9}}{\sqrt{\frac{49}{9}}} = \sqrt{\frac{81}{49}} = \frac{9}{7}$$

Nishita's speed = $\frac{7}{9}$ Nikita's speed

$$= \frac{7}{9} \times 36 = 28 \text{ km/h}$$

12. By walking at $\frac{4}{5}$ th of his usual speed, Mohan is 6 minutes late to office. Find his usual time to cover the distance ?

Sol. Here, change in time

$$= 6 \text{ and } \frac{a}{b} = \frac{4}{5}$$

We have, change in time

$$= \left(\frac{b}{a} - 1\right) \times \text{original time}$$

$\Rightarrow$ original time

$$= \frac{\text{change in time}}{\left(\frac{b}{a} - 1\right)} = \frac{6}{\left(\frac{5}{4} - 1\right)}$$

$$= 24 \text{ minutes}$$

Alternate

	Original	New
Speed	5	4
Time	4	5

1 unit difference

$$\text{Time} \propto \frac{1}{\text{Speed}}$$

$$1 \text{ unit} \longrightarrow 6 \text{ minutes}$$

$$4 \text{ units} \longrightarrow 6 \times 4 = 24 \text{ minutes}$$

Usual time to cover the distance = 24 minutes.

13. By walking at $\frac{3}{4}$ th of his usual speed, a man reaches office 20 minutes later than usual. His usual time is ?

Sol. Here, change in time

$$= 20 \text{ and } \frac{a}{b} = \frac{3}{4}$$

We have, change in time

$$= \left(\frac{b}{a} - 1\right) \times \text{original time}$$

$\Rightarrow$ Original time

$$= \frac{\text{Change in time}}{\left(\frac{b}{a} - 1\right)}$$

$$= \frac{20}{\left(\frac{4}{3} - 1\right)} = 60 \text{ minutes}$$

Alternate

	Old	New
Speed	4	3
Time	3	4

1 unit difference

$$1 \text{ unit} \longrightarrow 20 \text{ minutes}$$

$$3 \text{ units} \longrightarrow 20 \times 3 = 60 \text{ minutes}$$

Usual time to reach = 60 minutes

14. Two bicyclists do the same journey by travelling respectively, at the rates of 9 and 10 km an hour, find the length of the journey when one takes 32 minutes longer than the other ?

Sol. Here, change in speed

$$= 10 - 9 = 1; \text{ product of speed}$$

$$= 9 \times 10 = 90 \text{ and difference of}$$

$$\text{time} = \frac{32}{60}$$

We have, $\frac{\text{Product of speed}}{d}$

$$= \frac{\text{Difference of speed}}{\text{Difference of time}}$$

$\Rightarrow d = \text{product of speed}$

$$\times \left(\frac{\text{Difference of time}}{\text{Difference of speed}} \right)$$

$$= 90 \times \frac{32}{60} = 48 \text{ km}$$

Alternate

	A	B
Speed	9	10
Time	10	9

1 unit more

$$1 \text{ unit} \longrightarrow 32 \text{ minutes}$$

$$10 \text{ units} \longrightarrow 32 \times 10 \text{ minutes}$$

$$= 320 \text{ minutes} = 5 \frac{1}{3} \text{ h}$$

Therefore, distance travelled in

$$5 \frac{1}{3} \text{ h} = (320 \times 9) \div 60 = 48 \text{ min.}$$

15. Mohan walks from Tilak Nagar to Moti Nagar and back in a certain time at the rate of

$3 \frac{1}{2}$ km/h. But if he had walked

from Tilak Nagar to Moti Nagar at the rate of 3 km/h and back from Moti Nagar to Tilak Nagar at the rate of 4 km/h, he would have taken 10 minutes longer. The distance between Tilak Nagar and Moti Nagar is

Sol. Let the distance = 84 km

$$(\text{L.C.M. of } 4, 3, \frac{7}{2})$$

Case- I	Case- II
84 km	84 km
24h	28h
24h	21h
$\frac{7}{2}$ km/h	3 km/h
$\frac{7}{2}$ km/h	4 km/h
Total time = 48 h	Total time = 49 h

60 minutes difference

$$60 \longrightarrow 10 \text{ minutes}$$

$$1 \longrightarrow \frac{10}{60}$$

$$84 \longrightarrow \frac{10}{60} \times 84 = 14 \text{ km}$$

distance = 14 km

16. Two persons x and y walk from a place P at 5 km/hr and 6 km/hr respectively. How much distance will they be apart (in kms) after 4 hours.

(i) If they walk in the same direction.

(ii) If they walk in opposite direction.

(a) 4,44 (b) 5,55

(c) 4,34 (d) 5,44



Sol. (a) Distance travelled by x in 4 hours = $5 \times 4 = 20$ km.

Distance travelled by y in 4 hours = $6 \times 4 = 24$ km.

If they go in same direction,

Distance b/w them = $24 - 20 = 4$ km.

If they go in opposite direction,

Distance b/w them = $24 + 20 = 44$ km.

Alternate

By the concept of relative speed.

If they go in same direction
relative speed = $(6 - 5)$ km/hr.
= 1 km/hr.

If they go in opposite direction relative speed = $(6 + 5) = 11$ km/hr.

Since they walk for same interval of time i.e. 4 hours

Distance b/w them when they walk in same direction = Relative speed $\times$ time = $1 \times 4 = 4$ km.

Distance b/w them when they walk in opposite direction
= $11 \times 4 = 44$ km.

17. A thief runs at a speed of 10m/s. A policeman runs behind him at a speed of 12.5m/sec but the policeman had started running after 10 seconds. After how many meters, will the policeman catch the thief?

- (a) 600 mtr. (b) 500 mtr.
(c) 400 mtr. (d) 300 mtr.

Sol (b) Since, Policeman started after 10 sec.

Distance covered by thief in 10 sec = $10 \text{ m/s} \times 10 \text{ sec} = 100 \text{ m}$.

Relative speed to policeman & thief = $12.5 - 10 = 2.5 \text{ m/s}$

Time taken by policeman to catch the thief = $\frac{100}{2.5} = 40 \text{ sec}$.

Distance covered by policeman in 40 sec will be the required distance = $12.5 \times 40 = 500 \text{ meters}$.

18. Two persons cover the same distance at a speed of 25km/hr. and 30km/hr respectively. Find the distance travelled if one person takes 25 min. more than the other.

- (a) 62.5 km (b) 63.9 km
(c) 60 km. (d) 72 km

Sol. (a) Let x be the distance travelled by two persons with speed S_1 & S_2 respectively and t be the more time required by a person to cover same distance.

We can say that,

$$\frac{x}{S_1} - \frac{x}{S_2} = t$$

$$x \frac{S_2 - S_1}{S_1 S_2} = t$$

$$x = \left[\frac{S_1 S_2}{S_2 - S_1} \right] \cdot t$$

$$\text{Distance} = \frac{\text{Product of Speed}}{\text{Difference of Speed}} \times [\text{more time}]$$

Using above formula:-

$$t = \frac{25}{60} \text{ hours}$$

$$\text{Distance} = \frac{30 \times 25}{5} \times \frac{25}{60} = \frac{125}{2} = 62.5 \text{ km}.$$

Alternate

$$\text{Speed} \propto \frac{1}{\text{Time}}$$

$$\text{Ratio of speed } 25 \quad 30$$

$$\Rightarrow 5 : 6$$

$$\text{Ratio of time } 6 : 5$$

+1

1 Unit = 25 min.

time required by first person to cover the distance = 6 Units

$$= 25 \times 6 = 150 \text{ min i.e. } 2\frac{1}{2} \text{ hours}.$$

Total distance = speed $\times$ time

$$= 25 \times \frac{5}{2} = \frac{125}{2} = 62.5 \text{ km}.$$

19. A person covers certain distance at a speed of 60 km/hr without stoppage and with stoppages he travels the same distance at a speed of 40 km/hr. How many minutes/hour does he stop?

- (a) 30 min. (b) 26 min.
(c) 20 min. (d) 35 min.

Sol. (c) Let the Distance be = D km.

time taken without stoppage at

the rate of 60 km/hr, $T = \frac{D}{60}$ hr.

time taken with stoppage at the

rate of 40 km/hr, $T = \frac{D}{40}$ hr.

Difference in time

$$= \frac{D}{40} - \frac{D}{60} = \frac{D}{120} \text{ hr.}$$

$$\text{Rest/hour} = \frac{D}{120} \div \frac{D}{40} \text{ hr.}$$

$$= \frac{D}{120} \times \frac{40}{D} = \frac{1}{3} \text{ hr.} = 20 \text{ min.}$$

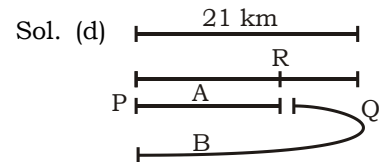
Alternate

$$\text{Time} = \frac{\text{Diff. in speed}}{\text{Speed without stoppage}} \times 60$$

$$= \frac{20}{60} \times 60 = 20 \text{ min.}$$

20. Two persons A and B walk from P to Q, which are at a distance of 21 km at 3 km/hr and 4 km/hr respectively, B reaches Q returns immediately and meets A at R. Find the distance from P to R.

- (a) 12 km (b) 16 km
(c) 28 km (d) 18 km



Let A & B meet after "t" time

Now, In time t

A cover PR & B covers PQ + QR.

Total distance by A & B both

$$= PR + PQ + QR = 2 PQ$$

$$\therefore 3t + 4t = 2 \times 21$$

$$7t = 42$$

$$t = 6 \text{ hours.}$$

Distance covered by A in 6 hours in $3 \times 6 = 18 \text{ km}$.

So, PR = 18 km.

21. A person covers a distance in 40 min, if he runs at a speed of 45 km/hr on an average. Find the speed at which he must run to reduce the time of Journey to 30 min.

- (a) 50 km/hr. (b) 35 km/hr.
(c) 60 km/hr. (d) 36 km/hr.



Sol. (c) Distance covered in both the cases is equal

$$S_1 t_1 = S_2 t_2$$

$$45 \times \frac{40}{60} = S_2 \times \frac{30}{60}$$

$$S_2 = 60 \text{ km/hr.}$$

22. A man takes 6 hours and 30 mins for walking to a certain place and riding back respectively. He would have gained 2 hours 10 minutes by riding both ways. How long would he take to walk both ways?

- (a) 480 mins. (b) 520 mins.
(c) 560 mins. (d) 600 mins.

Sol. (b) Walk + Ride = 390 min ..(i)
Gained two hours 10 min. by riding means riding both ways he took $390 - 130 = 260$ min.

$\therefore$ Ride + Ride = 260 min.

one side riding = 130 min.

Put the value in equation (i)

$$\text{Walk} + 130 \text{ min} = 390 \text{ min}$$

$$\text{One side walk} = 390 - 130 = 260 \text{ min}$$

$$\text{Both side walk} = 2 \times 260 \text{ min} = 520 \text{ min.}$$

23. A person has to reach a certain place at a certain time and he find that he will be 15 minutes late if he walks at 4 km/hr and 10 min earlier, if he walks at 6 km/hr. Find the distance he has to cover?

- (a) 3 km (b) 4 km
(c) 5 km (d) 6 km

Sol. (c) Let the distance be 'D' km.

$$\frac{D}{4} - \frac{D}{6} = \frac{15+10}{60}$$

$$\frac{D}{12} = \frac{25}{60}$$

$$D = 5 \text{ km}$$

Alternate

$$D = \frac{S_1 \times S_2}{S_1 - S_2} \times [\text{Difference of time}]$$

$$\Rightarrow \frac{6 \times 4}{2} \times \frac{25}{60} = 5 \text{ km.}$$

24. A man covered a certain distance at certain speed. If he had moved 3km/hr faster, he would have taken 40 minutes less. If he had moved 2 km/hr slower, he would have taken 40 mins more. The distance (in kms) is :

- (a) 35 (b) $36\frac{2}{3}$
(c) $37\frac{1}{2}$ (d) 40

Sol. (d) Distance in both the case in same.

$$D = \frac{S_1 \times S_2}{S_1 - S_2} \times [\text{Difference of time}]$$

Let Speed of the man be S km/hr.

$$\frac{S(S+3)}{3} \times \frac{40}{60} = \frac{S(S-2)}{2} \times \frac{40}{60}$$

$$2(S+3) = 3(S-2)$$

$$S = 12 \text{ km/hr.}$$

$$\text{Distance} = \frac{12 \times (12+3)}{3} \times \frac{40}{60} = 40 \text{ km.}$$

25. A person has to cover a distance of 6 km in 45 min. If he covers one half of the distance in two-third of the total time then to cover the remaining distance in the remaining time, his speed must be:-

- (a) 6km/hr. (b) 8 km/hr.
(c) 12 km/hr. (d) 15 km/hr.

Sol. (c) Half of the distance = 3 km.

Two-third of the total time

$$= \frac{2}{3} \times \frac{45}{60} = \frac{1}{2} \text{ hour.}$$

Speed for half of the journey

$$= \frac{3}{\frac{1}{2}} = 6 \text{ km/hr.}$$

Time to cover remaining the distance (3 km) = $\frac{1}{4}$ hr.

$$\text{Speed must be} = \frac{3}{\frac{1}{4}} = 12 \text{ km/hr.}$$

26. In a flight of 600 km an aircraft was slowed down due to bad weather. Its average speed for the trip is reduced by 200 km/hr and the time of the flight increased by 30 min. The duration of the flight is -

- (a) 1 hr. (b) 2 hrs.
(c) 3 hrs. (d) 4 hrs.

Sol. (a) Let duration of aircraft be t hours.

$$S = \frac{D}{T}$$

$$S_1 - S_2 = 200 \text{ km/hr.}$$

$$\frac{600}{t} - \frac{600}{t+\frac{1}{2}} = 200$$

$$\frac{600}{t} - \frac{1200}{2t+1} = 200$$

$$(2t+1)600 - t \times 1200 = 200t(2t+1)$$

$$6t+3-6t=2t^2+t$$

$$2t^2+t-3=0$$

$$2t^2+3t-2t-3=0$$

$$(2t+3)(t-1)=0$$

$$t=1, t=-\frac{3}{2} \text{ [neglect]}$$

Note: In these question go through options.

Alternate: 1

Time	Distance
$\frac{1}{2}$	200
1	400
$\frac{3}{2}$	600

So, time = 1 hour

Alternate: 2

$$\frac{S(S-200)}{200} \times \frac{1}{2} = 600$$

$$S = 600 \text{ km/h}$$

then,

$$\text{Time} = \frac{600}{600} = 1 \text{ hour}$$

27. A walks around a circular field at the rate of one round/hour, while B runs around it at the rate of six rounds/ hour. They starts in the same direction from the same point at 7 : 30 am. They shall first cross each other at-

- (a) 7:42 am (b) 7:48 am
(c) 8:10 am (d) 8:30 am

Sol. (a) Relative speed of B with respect to A.

$$= (6-1) \text{ rounds/hr.} = 5 \text{ rounds/hr.}$$

$\therefore$ Time taken to complete one round by both of them

$$= \frac{60^{\text{min}}}{5} = 12 \text{ min.}$$

They will meet for first time after 12 min.

$\therefore$ They will meet at 7 : 42 am.



28. A car travelling at $\frac{5}{7}$ of its actual speed covers 42 km in 1 hour 40 min 48 second. Find the actual speed of the car?

(a) $17\frac{6}{7}$ km/hr. (b) 25 km/hr.

(c) 35 km/hr. (d) 30 km/hr.

Sol. (c) Let actual speed be x km/hr.

$$\frac{42}{\frac{5x}{7}} = 1 \text{ hr. } 40 \text{ min. } 48 \text{ sec.}$$

$$x = \frac{42 \times 7}{5 (1 \text{ hr. } 40 \text{ min. } 48 \text{ sec.})}$$

$$x = \frac{42 \times 7}{5 \text{ hr. } 200 \text{ min. } 4 \text{ sec.}}$$

$$x = \frac{42 \times 7}{5 + 3\frac{20}{60} + \frac{4}{60}}$$

$$x = \frac{42 \times 7}{8\frac{24}{60}} = \frac{7 \times 42}{\frac{42}{5}} = 35 \text{ km/hr.}$$

Alternate

Let actual speed be 7 Units

$$\text{Present Speed } \frac{5}{7} \times 7 \text{ Units} = 5 \text{ units}$$

$$\frac{42}{5 \text{ Units}} = 1 \text{ hr. } 40 \text{ min. } 48 \text{ sec.}$$

$$\frac{42}{5 \text{ Units}} = 1 + \frac{40}{60} + \frac{48}{3600} = \frac{126}{75} \text{ hr.}$$

$$\frac{1}{5 \text{ Units}} = \frac{1}{25} \Rightarrow 1 \text{ unit} = 5 \text{ km/hr.}$$

Actual speed = 7 Units = 35 km/hr.

29. A man can reach a certain place in 30 hrs. If he reduces his speed by $\frac{1}{15}$ th he covers 10 km less in that time. Find his speed.

(a) 4 km/hr. (b) 5 km/hr.

(c) $5\frac{1}{2}$ km/hr. (d) 6 km/hr.

Sol. (b) Let the distance covered in both cases be D_1 & D_2 respectively.

Let the speed be S_1 & S_2

$$D_1 - D_2 = 10 \text{ km.}$$

$$30 S_1 - \frac{14}{15} S_1 \times 30 = 10 \text{ km.}$$

$$30 \left[S_1 - \frac{14}{15} S_1 \right] = 10 \text{ km.}$$

$$\frac{S_1}{15} \times 30 = 10$$

$$S_1 = 5 \text{ Km/hr.}$$

30. A starts from a place P to go to a place Q. At the same time B starts from Q for P. If after meeting each other A and B took 4 and 9 hours more respectively to reach their destinations, the ratio of their speeds is

(a) 3 : 2 (b) 5 : 2

(c) 9 : 4 (d) 9 : 13

Sol. (a) Speed $\propto \frac{1}{\text{Time}}$

use formula,

$$\frac{\text{Speed to A}}{\text{Speed to B}} = \sqrt{\frac{\text{time of B}}{\text{time of A}}} = \sqrt{\frac{9}{4}} = \frac{3}{2}$$

$$\text{Speed of A} : \text{Speed of B} = 3 : 2$$

31. A man covers a certain distance between his house and office on scooter. Having an average speed of 30 km/hr he is late by 10 min. However, with a speed of 40 km/hr he reaches his office 5 min earlier. Find the distance between his house and office.

(a) 20 km (b) 25 km

(c) 30 km (d) 35 km

Sol. (c) Distance = $\frac{\text{Product of Speed}}{\text{Difference of Speed}} \times (\text{time difference})$ (defined in earlier question)

$$\Rightarrow \frac{40 \times 30}{10} \times \frac{15}{60} = 30$$

Distance is 30 km.

32. Two guns were fired from the same place at an interval of 13 minutes but a person in a train approaching the place hears the second firing 12 minutes 30 seconds after the first. Find the speed of the train, supposing that sound travels at 330 metres per second.

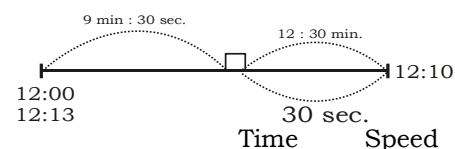
(a) $47\frac{13}{25}$ km/hr

(b) $45\frac{13}{25}$ km/hr

(c) $42\frac{13}{25}$ km/hr

(d) $44\frac{25}{13}$ km/hr

Sol. (a) Let the first firing at 12.00 and second be at 12.13



Train	750 sec.	1
Sound	30 sec.	25

$$25 \text{ Units} = 330$$

$$1 \text{ Unit} = \frac{330}{25} \times \frac{18}{5} = 47\frac{13}{25} \text{ km/hr.}$$

33. A monkey tries to ascend a greased pole 14 metre high. He ascends 2 metre in first minute and slips down 1 metre in the second minute. If he continues to ascend in this fashion, how long does he take to reach the top?

(a) 24 min (b) 25 min

(c) 28 min (d) 32 min

Sol. (b) In every two minutes monkey ascends one meter.

$$2 \text{ min} \quad 1 \text{ meter}$$

$$\downarrow \times 12 \quad \downarrow \times 12$$

$$24 \text{ min} \quad 12 \text{ meters}$$

$$\downarrow +1 \text{ min} \quad \downarrow \times +2 \text{ in next one min.}$$

$$25 \text{ min} \quad 14 \text{ meters}$$

34. A person has to cover a distance of 80 km in 10 hrs. If he covers half of

the journey in $\frac{3}{5}$ of time, what should be his speed to cover the remaining distance in the time left?

(a) 6 km/hr (b) 8 km/hr

(c) 10 km/hr (d) 12 km/hr.

Sol. (c) Half journey = 40 km.

$$\frac{3}{5} \text{ time} = \frac{10 \times 3}{5} = 6 \text{ hours.}$$

$$\text{Remaining distance} = 40 \text{ km}$$

$$\text{Remaining time} = 4 \text{ hours}$$

$$\text{Required Speed} = \frac{40}{4} = 10 \text{ km/hr.}$$

35. A man travels 360 km in 4 hrs, partly by air and partly by train. If he had travelled all the way by

air, he would have saved $\frac{4}{5}$ of the

time he was in train and would have arrived his destination 2 hours early. Find the distance he travelled by air and by train.



- (a) 90 km, 270 km
 (b) 95 km, 275 km
 (c) 94 km, 282 km
 (d) 92 km, 292 km

Sol. (a) If all the distance is covered by air he would reach destination 2 hours early.

Speed of aeroplane

$$= \frac{360}{2} = 180 \text{ km/hr.}$$

He saved 2 hours = $\frac{4}{5}$ of time he was in train.

$$\begin{aligned} \text{Train Journey time} &= \frac{5 \times 2}{4} \\ &= 2.5 \text{ hours.} \end{aligned}$$

Actual Journey time of aeroplane = $4 - 2.5 = 1.5$ hours.

Distance travelled in air

$$= 180 \times \frac{3}{2} = 270 \text{ km.}$$

Distance travelled by train
 = $360 - 270 = 90$ km.

36. A person travelled 120 km by steamer, 450 km by train and 60 km by horse. The total journey took 13 hours 30 minutes. If the rate of the train is 3 times that of the horse and 1.5 times that of the steamer, find the rate of the train per hour.

- (a) 60 km/hr (b) 65 km/hr
 (c) 70 km/hr (d) 75 km/hr

Sol. (a) Let speed of horse be x km/hr.

Train	Steamer	horse
$3x$	$2x$	x

So,

$$\frac{120}{2x} + \frac{450}{3x} + \frac{60}{x} = 13\frac{1}{2}$$

$$\Rightarrow \frac{270}{x} = \frac{27}{2}$$

$$x = 20$$

Speed of train = $3x = 60$ km/hr.

37. From two places, 60 km apart, A and B start towards each other and meet after 6 hours. Had A travelled with $\frac{2}{3}$ of his speed and B travelled with double of his speed, they would have met after 5 hours. The speed of A is.

- (a) 4 km/hr (b) 6 km/hr
 (c) 10 km/hr (d) 12 km/hr

Sol. (b) Let Speed of A = S_A

Speed of B = S_B

$$S_A + S_B = \frac{60}{6} = 10 \text{ km./hr....(i)}$$

$$\frac{2}{3} S_A + 2S_B = \frac{60}{5} = 12 \text{ km/hr.}$$

$$S_A + 3S_B = 18 \text{ km/hr.} \quad \dots\text{(ii)}$$

Solving (i) and (ii) we get

$$2S_B = 8$$

$$S_B = 4 \text{ km/hr.}$$

$$S_A = 6 \text{ km/hr.}$$

38. A, B and C start together from the same place to walk round a circular path of length 12 km. A walks at the rate of 4 km/hr, B at the rate of 3 km/hr and C at

the rate of $\frac{3}{2}$ km/hr. They will meet together at the starting place at the end of

- (a) 10 hrs (b) 12 hrs
 (c) 15 hrs (d) 24 hrs

Sol. (d) Time taken by A to cover cir-

$$\text{cular path} = \frac{12}{4} = 3 \text{ hr.}$$

$$\text{time taken by B} = \frac{12}{3} = 4 \text{ hr.}$$

$$\text{time taken by C} = \frac{12}{\frac{3}{2}} = 8 \text{ hr.}$$

They will meet after 24 hr.

[L.C.M of 3, 4, 8]

39. Two boys begin together writing out a booklet containing 8190 lines. The first boy starts with the first line, writing at the rate of 200 lines an hour; and the second boy starts with the last line, the writes 8189th line and so on., proceeding backward at the rate of 150 line an hour. At what line will they meet?

- (a) 4680 (b) 4850
 (c) 5860 (d) 6850

Sol. (a) Total line = 8190 lines
 Relative speed = $(200 + 150)$
 = 350 lines/hour

$$\begin{aligned} \text{time taken to meet} &= \frac{8190}{350} \\ &= 23.4 \text{ hr.} \end{aligned}$$

line of meet from Starting = $200 \times 23.4 = 4680$ line.

40. A train 110 m in length runs through a station at the rate of 36 km per hour. How long will it take to pass a given point?

- (a) 11 sec (b) 12 sec
 (c) 13 sec (d) 15 sec

Sol. (a) According to the question

Length = 110m.

Speed = 36 km/hr.

$$T = \frac{\text{Distance}}{\text{Speed}}$$

$$T = \frac{110}{36 \times \frac{5}{18}} = 11 \text{ Second.}$$

41. A train 540 m long is running with a speed of 72 km/hr. In what time will it pass a tunnel 160 m long?

- (a) 40 sec (b) 30 sec
 (c) 35 sec (d) 42 sec

Sol. According to the question

$$\begin{aligned} \text{Total Distance} &= 540 + 160 \\ &= 700 \text{ m} \end{aligned}$$

$$\text{Speed} = \frac{72 \times 5}{18} = 20 \text{ m/s}$$

so,

$$T = \frac{700}{20} = 35 \text{ second}$$

42. A train starts from a place A at 6 a.m. and arrives at another place B at 4.30 p.m. on the same day. If the speed of the train is 40 km/hr find the distance travelled by the train?

- (a) 320 km (b) 230 km
 (c) 420 km (d) 400 km

Sol. (c) According to the question

Total time taken by train

$$= 10\frac{1}{2} \text{ hr.}$$

Total Distance

$$= 10\frac{1}{2} \times 40 = 420 \text{ km}$$



43. A train covers a distance of 10 km in 12 minutes. If its speed is decreased by 5 km/hr. Then time taken to cover the same distance will be:

(a) 10 minutes
(b) 13 minutes 20 sec.
(c) 13 minutes
(d) 11 minutes 20 sec.

Sol. (b) According to the question

$$\text{Speed of train} = \frac{10 \times 60}{12}$$

$$= 50 \text{ km/hr.}$$

$$\text{New speed} = 50 - 5 = 45 \text{ km/h}$$

$$\text{Required time} = \frac{10}{45} \times 60$$

$$13 \text{ minutes } 20 \text{ second}$$

44. A man walks 'a' km in 'b' hours. The time taken to walk 200 metres is

(a) $\frac{200b}{a}$ hours (b) $\frac{b}{5a}$ hours

(c) $\frac{b}{a}$ hours (d) $\frac{ab}{200}$ hours

Sol. (b) According to the question

$$\text{Speed of the man} = \frac{a}{b} \text{ km/h}$$

$$\text{Required time} = \frac{200}{1000} \times \frac{b}{a}$$

$$= \frac{b}{5a} \text{ hours}$$

45. A train is running at a speed of 90 km/hr. If crosses a signal in 10 sec., the length of the train (in metres) is

(a) 150 (b) 324
(c) 900 (d) 250

Sol. (d) According to the question
Speed = 90 km/hr

$$= \frac{90 \times 5}{18} = 25 \text{ m/s}$$

$$[\text{Time} = 10 \text{ second}]$$

$$= \text{length of the train} = 25 \times 10$$

$$= 250 \text{ m/s}$$

46. Two trains, A and B, start from stations X and Y towards each other they take 4 hours 48 minutes and 3 hours 20 minutes to reach Y and X respectively after they meet if train A is moving at 45 km/hr., then the speed of the train B is

(a) 60 km/hr (b) 64.8 km/hr
(c) 54 km/hr (d) 37.5 km/hr

Sol. (c) In these type question use the given below formula to save your valuable time

$$\text{Speed } \frac{S_1}{S_2} = \sqrt{\frac{T_1}{T_2}}$$

$$\frac{45}{S_2} = \sqrt{3\frac{1}{3} \div 4\frac{4}{5}} = \sqrt{\frac{50}{72}}$$

$$S_2 = 45 \times \frac{6}{5} = 54 \text{ km/hr}$$

47. A train 110 metres long travels at 60 km/hr. How long do it take to cross another train 170 metres long, running at 54 km/hr in the same direction?

(a) 2 min 48 sec (b) 3 min 48 sec
(c) 5 min 48 sec (d) 1 min 48 sec

Sol. (a) According to Question

$$\text{Total Distance} = 110 + 170$$

$$= 280 \text{ meter}$$

$$\text{Total speed} = (60 - 54) \text{ Same}$$

$$\text{Direction } \frac{6 \times 5}{18} = \frac{5}{3} \text{ m/s}$$

$$T = \frac{280 \times 3}{5} = 168 \text{ second}$$

$$= 2 \text{ min } 48 \text{ second}$$

48. The distance between place A and B is 999 km. an express train leaves place A at 6 am and runs at a speed of 55.5 km/hr. The train stops on the way to 1 hour 20 minutes. It reaches B at.

(a) 1 : 20 am (b) 12 pm
(c) 6 pm (d) 11 pm

Sol. (a) Time will be taken by train if it does not stop

$$= \frac{\text{distance}}{\text{speed}} = \frac{999 \text{ kms}}{55.5 \text{ km/hr}}$$

$$\text{without stop} = 18 \text{ hr}$$

$$\Rightarrow \text{but if stops on the way for 1 hour } 20 \text{ min before reaching at B.}$$

$$\Rightarrow \text{total time}$$

$$= 18 \text{ hr} + 1 \text{ hour } 20 \text{ min}$$

$$= \text{Reaching time at B}$$

$$= 6 \text{ am} + 19 \text{ hour } 20 \text{ min.}$$

$$= 1 : 20 \text{ am}$$

49. Two trains start from a certain place on two parallel tracks in the same direction. The speed of the trains are 45 km/hr and 40 km/hr respectively. The distance between the two trains after 45 minutes will be

(a) 3.75 km or 3750 m

(b) 2 km or 2750 m

(c) 3 km or 4750 m

(d) 3 km or 7250 m

Sol. (c) Relative speed

$$= (45 - 40) \times \frac{5}{18} = \frac{25}{18} \text{ m/s}$$

$$= \text{Required distance}$$

$$= \frac{25}{18} \times 45 \times 60$$

$$= 3750 \text{ metres or } 3.75 \text{ km}$$

50. Points 'A' and 'B' are 70 km apart on a highway and two cars start at the same time. If they travel in the same direction, they meet in 7 hours, but if they travel towards each other they meet in one hour. Find the speed of the two cars (in km/hr).

(a) 20, 30 (b) 40, 30

(c) 30, 50 (d) 20, 40

Sol. (b) Let the speed of the cars be S_1 and S_2

$$= S_1 - S_2 = \frac{70}{7} = 10 \quad \dots(i)$$

$$\text{and } S_1 + S_2 = \frac{70}{1} = 70 \quad \dots(ii)$$

From equation (i) and (ii)

$$S_1 = \frac{10+70}{2} = 40 \text{ km/hr}$$

$$\text{and } S_2 = \frac{70-10}{2} = 30 \text{ km/hr}$$

= Required speeds are 40 km/hr and 30 km/hr

51. P and Q are 27 km away. Two trains with speed of 24 km/hr and 18 km/hr respectively start simultaneously from P and Q and travel in the same direction. They meet at a point R beyond Q. Distance QR is



(a) 126 km (b) 81 km

(c) 48 km (d) 36 km

Sol. (b) Relative speed = $24 - 18$
 $= 6 \text{ km/hr}$

time required by faster train to over take slower train

$$= \frac{27}{6} = 4\frac{1}{2} \text{ hr}$$

distance between Q and R

$$= 18 \times 4\frac{1}{2} = 81 \text{ km.}$$

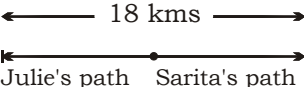
52. Sarita and Julie start walking from the same place in the opposite directions. If Julie walks

at a speed of $2\frac{1}{2} \text{ km/hr}$ and

Sarita at a speed of 2 km/hr , in how much time will they be 18 km apart?

(a) 4.0 hrs (b) 4.5 hrs

(c) 5.0 hrs (d) 4.8 hrs

Sol. (a) 

$2\frac{1}{2} \text{ km/hr}$ 2 km/hr

Their relative speed in opposite direction

$$= 2\frac{1}{2} \text{ km/h} + 2 \text{ km/hr}$$

$$= 4\frac{1}{2} \text{ km/hrs}$$

$\Rightarrow$ Time taken by them to cover a distance of 18 kms is

$$= \frac{18}{\frac{9}{2}} = 4\text{h} \left\{ \text{time} = \frac{\text{distance}}{\text{speed}} \right\}$$

53. Two trains one 160 m and the other 140 m long are running in opposite directions on parallel tracks, the first at 77 km an hour and the other at 67 km an hour . How long will

they take to cross each other?

(a) 7 seconds (b) $7\frac{1}{2}$ seconds

(c) 6 seconds (d) 10 seconds

Sol. (b) Relative speed of trains

$$= 77 + 67 = 144 \text{ km/hr}$$

$$= 144 \times \frac{5}{18} = 40 \text{ m/s}$$

$$\text{Total length} = 160 + 140 = 300 \text{ m}$$

$$\therefore \text{Required time} = \frac{300}{40}$$

$$= 7\frac{1}{2} \text{ seconds}$$

54. A moving train, 66 metre long, overtakes another train 88 metre long, moving in the same direction in 0.168 minute . If the second train is moving at 30 km per hr , at what speed is the first train moving?

(a) 85 km/hr . (b) 50 km/hr .(c) 55 km/hr . (d) 25 km/hr .

Sol. (a) Let the speed of the first train = $x \text{ m/min}$

Speed of the second train = 30 km/

$$\text{hr} = 30 \times \frac{1000}{60}$$

$$= 500 \text{ m/min.}$$

$\therefore$ According to the question,

$$\frac{66 + 88}{x - 500} = 0.168$$

$$[\text{relative speed} = (x - 500)]$$

$$\Rightarrow \frac{154}{x - 500} = 0.168$$

$$\Rightarrow 0.168 x = 238$$

$$\Rightarrow x = \left(\frac{238}{0.168} \times 1000 \right) \text{ m/min}$$

$$= \left(\frac{238}{168} \times 1000 \right) \times \frac{3}{50} \text{ km/hr}$$

$$= 85 \text{ km/hr.}$$

Alternatively

$$\text{Relative speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{88+66}{168} = \frac{154 \times 1000}{168 \times 60} \text{ m/s}$$

$$= \frac{275}{18} \times \frac{18}{5} \text{ km/h} = 55 \text{ km/h}$$

i.e. speed of 1st train – speed of 2nd train = 55 km/h

$$\text{Speed of first train} = 55 + 30 = 85 \text{ km/h}$$

55. Two trains 140 m and 160 m long run at the speeds of 60 km/hour and 40 km/hour respectively in opposite directions on parallel tracks. The time (in seconds) which they take to cross each other, is :

(a) 10

(b) 10.8

(c) 9

(d) 9.6

Sol. (b) Relative speed of trains

$$= 60 + 40 = 100 \text{ km/hr}$$

$\therefore$ Required time

$$= \frac{(140 + 160) \text{ m}}{100 \text{ km/hr}}$$

$$= \frac{300}{100 \times \frac{5}{18}} \text{ sec.}$$

$$= \frac{300 \times 18}{100 \times 5} = 10.8 \text{ sec.}$$

56. A coolie standing on a railway platform observes that a train going in one direction takes 4 seconds to pass him. Another train of same length going in opposite direction takes 5 seconds to pass him. The time taken (in seconds) by the two train to cross each other will be :

(a) 35

(b) 36.5

(c) $40/9$

(d) none of these

Sol. (c) Let the length of each train be $x \text{ metre}$ and the speeds of the trains are S_1 and S_2 respectively.

$$S_1 = \frac{x}{4}, S_2 = \frac{x}{5}$$

$$\text{Now, Required time} = \frac{2x}{\frac{x}{4} + \frac{x}{5}}$$

$[\therefore \text{Trains are moving opposite}]$

$$= \frac{40}{9} \text{ seconds}$$



57. A passenger sitting in a train of length 1 m, which is running with a speed of 60 km/h passing through two bridges, notices that he crosses the first bridge and the second bridge in time intervals which are in the ratio 7 : 4 respectively. If the length of the first bridge is 280 m, then the length of second bridge is :

- (a) 490 m
(b) 220 m
(c) 160 m
(d) Can't be determined

Sol. (c) **Note** : Here the length of the train in which passenger is travelling is not considered since we are concerned with the passenger instead of train. So the length of the bridge will be directly proportional to the time taken by the passenger respectively.

$$\text{Therefore, } \frac{t_1}{t_2} = \frac{l_1}{l_2}$$

Where t_1 and t_2 are times and l_1 and l_2 are lengths of bridges.

$$\frac{7}{4} = \frac{280}{l_2} \Rightarrow l_2 = 160$$

length of second bridge = 160 m

58. Two guns are fired from the same place at an interval of 6 minutes. A person approaching the place observes that 5 minutes 52 seconds have elapsed between the hearing of the sound of the two guns. If the velocity of the sound is 330 m/sec, the man was approaching that place at what speed (in km/hr) ?

- (a) 24 (b) 27
(c) 30 (d) 36

Sol. (b) Difference of time
= 6 min – 5 min. 52 sec. = 8 sec.
i.e. Distance covered by man in 5 min 52 seconds = Distance covered by sound in 8 seconds

i.e. **Ratio of time required** → $\frac{\text{Man}}{\text{Sound}} \rightarrow 5\text{min } 52\text{sec} : 8\text{ sec}$
= 352 : 8
= 44 : 1

Ratio of speed → $\frac{\text{Man}}{\text{Sound}} \rightarrow 1 : 44$
 $\left(\times 7.5 \right) \quad \left(\times 7.5 \right)$
7.5 330

i.e. speed of the man = 7.5 m/sec

$$= 7.5 \times \frac{18}{5} = 1.5 \times 18$$

$$= 27 \text{ km/hr}$$

Alternatively

Speed of the man

$$= 1188 \left(\frac{t_1 - t_2}{t_2} \right) \text{ km/hr}$$

$$\left[\because \text{speed of sound} \right]$$

$$= 330 \text{ m/sec}$$

$$= 1188 \times \frac{8\text{sec}}{5\text{ min } 52\text{ sec}}$$

$$= 1188 \times \frac{8}{352}$$

$$= \frac{1188}{44} = 27 \text{ km/hr}$$

59. After travelling 5 hours a train meets with an accident. Due to this it has to stop for 2 hours. After this the train starts moving

at $55\frac{5}{9}\%$ of its speed, and

reaches to its destination $12\frac{2}{9}$

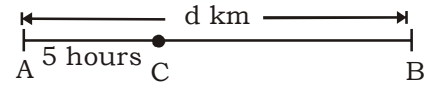
hours late. If the accident occurred 150 km ahead on the same line then the train reaches

destination $10\frac{8}{9}$ hours late.

Find the original speed of the train?

- (a) 90 km/h (b) 108 km/h
(c) 100 km/h (d) 72 km/h

Sol. (a) Let the speed of the train is x km/h and the distance of the journey is d km.



$$55\frac{5}{9}\% = \frac{500}{9 \times 100}$$

$$= \left(\frac{5}{9} \right) \rightarrow \text{original time}$$

$$\rightarrow \text{original speed}$$

Condition (I)

Difference time = (9 – 5) = 4 hrs.

$$4\text{h} \rightarrow \left(\frac{110}{9} - 2 \right) = \frac{92}{9}$$

$$1 \rightarrow \frac{23}{9}$$

$$5 \text{ units} \rightarrow \frac{23}{9} \times 5 = \frac{115}{9}$$

Condition (II)

Similarly,

$$4 \text{ h} \rightarrow \left(\frac{98}{9} - 2 \right) = \frac{80}{9}$$

$$1 \text{ h} \rightarrow \frac{20}{9}$$

$$5 \text{ units} \rightarrow \frac{20}{9} \times 5 = \frac{100}{9}$$

$$\text{Speed} = \frac{150}{\left(\frac{115}{9} - \frac{100}{9} \right)}$$

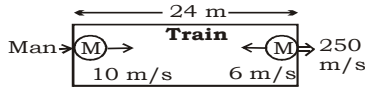
$$= \frac{150 \times 9}{15} = 90 \text{ km/h}$$

60. A train of 24 m length runs with a speed of 250 m/s. A man in train at the tail end of the train runs with a speed of 10 m/s. When he reaches the front end he turns back with a speed of 6 m/s and this process continues. How many rounds (up and down) he will complete if the train runs 8 kms, provided that during running he will not loose contact with the train ?

- (a) 3 (b) 4
(c) 5 (d) 6



Sol. (c)



To cover 8 kms, time taken by

$$\text{train} = \frac{8000}{250} = 32 \text{ sec.}$$

Required time to go from back end to front end (Up time)

$$= \frac{24}{10} = 2.4 \text{ sec.}$$

Required time to go from front end to back end Down time

$$= \frac{24}{6} = 4 \text{ sec.}$$

∴ For 1 round i.e. back and forth he will required 6.4 sec.

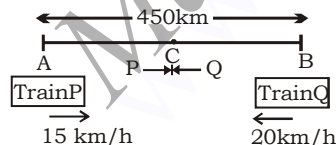
∴ In 32 seconds, he will complete

$$\frac{32}{6.4} = 5 \text{ rounds.}$$

61. The distance between two stations A and B is 450 km. A train P starts from A and moves towards B at an average speed of 15 km/hr. Another train Q starts from B, 20 minutes earlier than the train P, and moves towards A at an average speed of 20 km/hr. How far from A will the two trains meet?

- (a) 180 km (b) 320 km
(c) 190 km (d) 260 km

Sol. (c)



Let C be the point where both the trains P and Q meet. Distance covered by the train Q in 20 minutes

$$= \frac{20}{60} \times 20 = \frac{20}{3} \text{ km}$$

Remaining distance

$$= 450 - \frac{20}{3} = \frac{1330}{3} \text{ km}$$

Now both the trains will move then relative speed = (20 + 15) = 35 km/h

Required time in meeting

$$= \frac{1330}{3 \times 35} = \frac{38}{3} \text{ hours}$$

Distance from A to meeting point C

$$= t \times v = \frac{38}{3} \times 15 = 190 \text{ km}$$

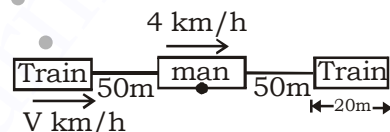
So, the trains will meet at 190 km away from A

62. A man can see only 50 m in fog. He was walking at a speed of 4 km/hr and saw a train was coming behind him. The train was 20 m in length and disappeared from his eyes after 30 seconds. Find the speed of the train?

- (a) $18\frac{2}{5}$ km/hr (b) $6\frac{3}{5}$ km/hr

- (c) $8\frac{1}{5}$ km/hr (d) $4\frac{2}{5}$ km/hr

Sol. (a) Assume speed of the train = V km/h



Total distance travelled by train = 50 + 50 + 20 = 120 m

Both man & train moving in the same direction then, relative speed = (V - 4) km/h

$$\text{we know} \rightarrow t = \frac{d}{v}$$

$$30 = \frac{(120) \times 18}{(V - 4) \times 5}$$

$$\Rightarrow 5V - 20 = 72$$

$$\Rightarrow 5V = 92$$

$$\Rightarrow V = \frac{92}{5} = 18\frac{2}{5} \text{ km/h}$$

$$\text{Speed of the train} = 18\frac{2}{5} \text{ km/h}$$

63. Two stations A and B are 790 km apart. A train starts at 2 pm from A to B at a speed of 70 km/h, and another train starts at the same time from B to A at a speed of 50 km/hr. Then find at what time and how much distance from B both the trains will meet each other, and also find if the train starts from B at 3 pm then at what time and how much distance from A both the trains will meet each other :

- (a) 9 pm, 490 km, 8 : 35pm,

$$329\frac{1}{6} \text{ km}$$

- (b) 10 pm, 450 km, 8 : 45pm,

$$329\frac{1}{6} \text{ km}$$

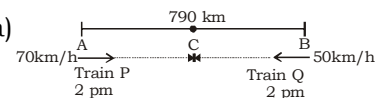
- (c) 11 pm, 400 km, 8 : 30pm,

$$329\frac{1}{6} \text{ km}$$

- (d) 12 : 30am, 425 km, 8 : 40 pm

$$, 329\frac{1}{6} \text{ km}$$

Sol. (a)



Both the trains are moving in opposite direction then relative speed = (70 + 50) = 120 km/h

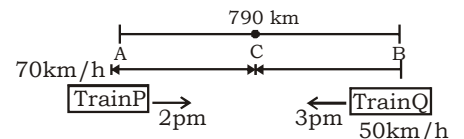
Time taken to meet both trains

$$= \frac{790}{120} = 6\frac{7}{12} \text{ hours}$$

So the trains will meet 6 hours 35 mins after 2 pm = 2 + (6h + 35 min.) = 8 : 35 pm

Distance between B and C

$$= 50 \times \frac{79}{12} = 329\frac{1}{6} \text{ km}$$



Distance travelled by train P till 3 pm (or in 1 hour)

$$D = 70 \times 1 = 70 \text{ km}$$

Now remaining distance

$$= 790 - 70 = 720 \text{ km}$$

Now both trains are moving in opposite direction relative speed = (70 + 50) = 120 km/h



Time to meet both the trains

$$= \frac{720}{120} = 6 \text{ hours}$$

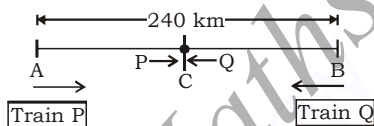
So they will meet 6 hours after at 3 pm. It means they will meet at 9 pm.

Distance between A and C
 $= 70 \times 7 = 490 \text{ km}$

∴ Thus both the trains will meet at 9 : 00 pm and 490 km from A.

64. Due to the technical snag in the signal system two trains start approaching each other on the same rail track from two different stations, 240 km away from each other. When the train starts a bird also starts moving to and fro between the two trains at 60 km/h touching each train each time. The bird is initially sitting on the top of the engine of one of the trains and it moves till these trains collide. If these trains collide one and a half hour after the start, then how many kilometres bird travels till the time of collision of the trains ?
- (a) 90 km (b) 130 km
 (c) 120 km (d) none of these

Sol. (a)



Let C is a point where both the trains P and Q collides.

According to question,

Trains collide after $3/2$ hours.

Distance travelled by bird

$$= 60 \times \frac{3}{2} = 90 \text{ km}$$

65. While walking down one the pavements of New York city. I notice that every 20 minute there is a city bus coming in the

opposite direction and every 30 minute there is a city bus overtaking me from behind. What is the time gap between one city bus passing a stationary point known as Local Bus Stop beside the route and immediately the next city bus in the same direction passing the same stationary point?

- (a) 27 min
 (b) 24 min
 (c) 25 min
 (d) can't determined

Sol. (b) Let the speed of the man
 $= x \text{ km/min}$

the speed of the bus $= y \text{ km/h}$

From question :

Condition (I)

When the bus and the man are moving in opposite direction.

$$20 = \frac{d}{(x+y)} \Rightarrow d = 20(x+y) \dots (i)$$

Condition (II)

When the bus and the man are moving in the same direction:

$$30 = \frac{d}{(y-x)} \Rightarrow d = 30(y-x) \dots (ii)$$

From equation (i) & (ii),

$$20(x+y) = 30(y-x)$$

$$2x + 2y = 3y - 3x$$

$$y = 5x \Rightarrow \frac{y}{x} = 5$$

Then here $d = 20(5 + 1) = 120$

Time gap in passing of a

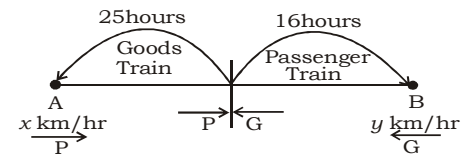
$$\text{stationary Pole} = \frac{120}{5}$$

$$= 24 \text{ min.}$$

66. A passenger train left town A for town B. At the same time, a goods train left town B for town A. The speed of each train is constant throughout the whole trip. Two hours after the trains met, they were 450 km apart. The passenger train arrived at the place of destination 16 hours after their meeting and the goods train, 25 hours after the meeting. How long did it take the passenger train to make the whole trip?

- (a) 21 hours (b) 28 hours
 (c) 36 hours (d) None of these

Sol. (c)



Passenger train $\rightarrow x \text{ km/h}$

Goods train $\rightarrow y \text{ km/h}$

Let the speed of the passenger and the Goods train is $x \text{ km/h}$ and $y \text{ km/h}$ respectively.

From question :

Condition (i)

When distance between them 450 km they meet after 2 hours.

We know:- Time $= \frac{\text{distance}}{v}$

$$2 = \frac{450}{x+y} \Rightarrow x + y = 225 \dots (i)$$

Condition (ii)

Apply the application,

$$\frac{S_1}{S_2} = \sqrt{\frac{T_2}{T_1}}$$

$$\Rightarrow S_1 : S_2 = 5 : 4$$

From condition

$$5x + 4x = 225 \Rightarrow x = 25$$

$$\therefore S_1 = 125 \text{ km/h}$$

$$S_2 = 100 \text{ km/h}$$

Total distance between the town A and B $= 125 \times 16 + 100 \times 25 = 4500 \text{ km}$

Time required to passenger train to travel the whole

$$\text{journey} = \frac{4500}{125} = 36 \text{ hours}$$

67. A train travels some distance with a uniform speed. If the speed of the train is 20 km/hr less then it takes 16 hours more. If its speed is 10 km/hr more then it takes 5 hours less during the whole journey. Then find the distance and the speed of the train and how much time will it take to travel the whole journey?



- (a) 2800 km, 70 km/h, 40 hours
 (b) 3500 km, 70 km/h, 40 hours
 (c) 4200 km, 140 km/h, 30 hours
 (d) none of these

Sol. (a) Note : In such type of questions use this formula to save your valuable time and make calculations easier.

$$\text{Distance} = \frac{xy}{x-y} (t_2 - t_1)$$

Explanation of terms:-

$x \rightarrow$ Initial speed

$y \rightarrow$ Increased/decreased speed

$(t_2 - t_1) \rightarrow$ Difference in time $\begin{cases} \rightarrow \text{Initial} \\ \rightarrow \text{Final} \end{cases}$

Let initial speed of the train
 = x km/h

$$(i) \quad \frac{x(x-20)}{20} \times 16 = \frac{x(x+10)}{10} \times 5$$

[$\therefore$ Distance in both cases should be equal]

$$8x - 160 = 5x + 50$$

$$3x = 210 \Rightarrow x = 70 \text{ km/h}$$

Initial speed of the train
 = 70 km/h

$$(ii) \quad \text{Distance} = \frac{70 \times 50}{20} \times 16$$

$$= 2800 \text{ km}$$

$$(iii) \quad \text{actual time} = \frac{\text{Distance}}{\text{speed}}$$

$$= \frac{2800}{70} = 40 \text{ hrs}$$

68. A bus is moving with a uniform speed travels a certain distance in a certain time. The speed of the bus is directly proportional to the distance travelled and inversely proportional to the square root of time. It travels 60 km in 4 hours at a speed of 40 km/h. Then find how much distance will it travel in 9 hours at a speed of 44 km/h?

(a) 70 km (b) 89 km

(c) 90 km (d) 99 km

Sol. (d) Let the speed of the bus = S

Let the time taken by the bus = T and

distance = d

from question,

$$S \propto \frac{d}{\sqrt{T}} \Rightarrow S = \frac{kd}{\sqrt{T}} \quad \dots(i)$$

From condition (i), $S = 40$ km/h,
 $d = 60$ km,

$T = 4$ hours, put values in eq. (i)

$$40 = \frac{k \times 60}{\sqrt{4}} \Rightarrow k = \frac{40 \times 2}{60}$$

$$\Rightarrow k = 4/3$$

from condition (ii) $S = 44$ km/h,

$d = ?$, $t = 9$ hours, $k = 4/3$

put values in equation (i)

$$44 = \frac{4 \times d}{3 \times \sqrt{9}} \Rightarrow d = \frac{44 \times 3 \times 3}{4} = 99$$

$d = 99$ km



Exercise

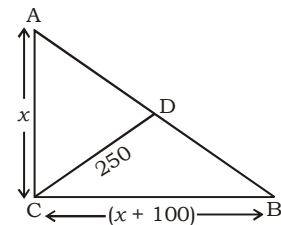
1. A man crosses a road 250 metres wide in 75 seconds. His speed in km/hr is:
(a) 10 km/hr (b) 12 km/hr
(c) 12.5 km/hr (d) 15 km/hr
2. An athlete runs 200 metres race in 24 seconds. His speed (in km/hr) is:
(a) 20 km/hr (b) 24 km/hr
(c) 28.5 km/hr (d) 30 km/hr
3. A man walking at the rate of 5 km/hr crosses a bridge in 15 minutes. The length of the bridge (in metres) is :
(a) 600 m (b) 750 m
(c) 1000 m (d) 1250 m
4. A man reduces his speed to $\frac{2}{3}$, he takes 1 hour more in walking a certain distance. The time (in hours) to cover the distance with his normal speed is:
(a) 2 hrs (b) 1 hrs
(c) 3 hrs (d) 1.5 hrs
5. A and B start at the same time with speeds of 40 km/hr and 50 km/hr respectively. If in covering the journey A takes 15 minutes longer than B, the total distance of the journey is:
(a) 46 km (b) 48 km
(c) 50 km (d) 52 kms
6. The speeds of A and B are in the ratio 3 : 4. A takes 20 minutes more than B to reach a destination. In what time does A reaches the destination?
(a) $1\frac{1}{3}$ hours (b) 2 hours
(c) $2\frac{2}{3}$ hours (d) $1\frac{2}{3}$ hours
7. A car can cover a certain distance in $4\frac{1}{2}$ hours. If the speed is increased by 5 km/hour, it would take $\frac{1}{2}$ hour less to cover the same distance. Find the slower speed of the car:
(a) 50 km/hour (b) 40 km/hour
(c) 45 km/hour (d) 60 km/hour
8. Two men start together to walk a certain distance, one at 4 km/h and another at 3 km/h. The former arrives half an hour before the later. Find the distance :
(a) 8 km (b) 7 km
(c) 6 km (d) 9 km
9. A train running at $\frac{7}{11}$ of its own speed reached a place in 22 hours. How much time could be saved if the train would run at its own speed ?
(a) 14 hours (b) 7 hours
(c) 8 hours (d) 16 hours
10. A man with $\frac{3}{5}$ of his usual speed reaches the destination $2\frac{1}{2}$ hours late. Find his usual time to reach the destination:
(a) 4 hours (b) 3 hours
(c) $3\frac{3}{4}$ hours (d) $4\frac{1}{2}$ hours
11. A car travelling with $\frac{5}{7}$ of its usual speed covers 42 km in 1 hour 40 min 48 sec. What is the usual speed of the car ?
(a) $17\frac{6}{7}$ km/hr
(b) 35 km/hr
(c) 25 km/hr (d) 30 km/hr
12. A and B started at the same time from the same place for a certain destination. B walking at $\frac{5}{6}$ of A's speed reached the destination 1 hour 15 minutes after A and B reached the destination in :
(a) 6 hours 15 minutes
(b) 7 hours 15 minutes
(c) 7 hours 30 minutes
(d) 8 hours 15 minutes
13. Buses start from a bus terminal with a speed of 20 km/hr at intervals of 10 minutes. What is the speed of a man coming from the opposite direction towards the bus terminal if he meets the buses at intervals of 8 minutes?
(a) 3 km/hr (b) 4 km/hr
(c) 5 km/hr (d) 7 km/hr
14. By walking at $\frac{3}{4}$ of his usual speed, a man reaches his office 20 minutes later than his usual time. The usual time taken by him to reach his office is:
(a) 75 minutes
(b) 60 minutes
(c) 40 minutes
(d) 30 minutes
15. A boy starts everyday from home to pick up his girlfriend from college at 3 : 30 p.m. One day his girlfriend left the college at 2 : 30 p.m. and start walking to home at 6 km/h. She meets her boyfriend in the way who start at his normal time and they reach home 24 minutes earlier than usual. Find his speed :
(a) 24 km/h (b) 66 km/h
(c) 6 km/h (d) 36 km/h
16. Rakesh yadav starts in Honda city from Delhi towards Goa. After sometime he realises that he will cover only 75% of the distance in the scheduled time and he therefore doubles his speed immediately and thus manages to reach Goa exactly on time. Find the time after which Rakesh yadav changed his speed, given that he could have been late by 3 hours if he had not changed his speed:
(a) 3 h (b) 4 h
(c) 5 h (d) 6 h



17. After travelling 3 hours a train meets with an accident due to this it stops for an hour. After this the train moves at 75 % speed of its original speed and reaches to destination 4 hours late. If the accident would occur at 150 km ahead in the same line then the train reaches only 3.5 hours late. Then find the distance of journey and the original speed of the train?
 (a) 100 km/h, 1200km
 (b) 150 km/h, 1200 km
 (c) 75 km/h, 1000km
 (d) 125 km/h, 900km
18. After travelling 25 km the speed of the car increases by $\frac{1}{4}$ th of its original speed, due to this the car reaches 30 minutes earlier to its destination. If the speed of the car increased 10 km before, then it reaches to its destination $32\frac{2}{5}$ minutes earlier. Then find the distance travelled by car:
 (a) 125 km (b) 150 km
 (c) 140 km (d) 165 km
19. Ravi, who lives in the countryside, caught a train for home earlier than usual day. His wife normally drives to the station to meet him. But yesterday he set out on foot from the station to meet his wife on the way. He reached home 12 minutes earlier than he would have reached, had he waited at the station for his wife. The car travels at a uniform speed, which is 5 times Ravi's speed on foot. Ravi reached home at exactly 6 O'clock. At what time would he have reached home if his wife, forewarned of his plan, had met him at the station?
 (a) 5 : 48 (b) 5 : 24
 (c) 5 : 00 (d) 5 : 36
20. Two rifles are fired from the same place at a difference of 11 minutes 45 seconds. But a man who is coming towards the place in a train hears the second sound after 11 minutes. Find the speed of train (assuming speed of sound = 330 m/s):
 (a) 72 km/h (b) 36 km/h
 (c) 81 km/h (d) 108 km/h
21. A dog after travelling 50 km meets a swami who counsels him to go slower. He then proceeds at $\frac{3}{4}$ of his former speed and arrives at his destination 35 minutes late. Had the meeting occurred 24 km further the dog would have reached its destination 25 minutes late. The speed of the dog before meeting swami is:
 (a) 48 km/h (b) 36 km/h
 (c) 54 km/h (d) 58 km/h
22. An aeroplane covers a certain distance at a speed of 240 km/hour in 5 hours. To cover the same distance in $1\frac{2}{3}$ hours, it must travel at a speed of :
 (a) 30 km./hr. (b) 360 km./hr.
 (c) 600 km./hr. (d) 720 km./hr.
23. A car travelling at a speed of 40 km/hour can complete a journey in 9 hours. How long will it take to travel the same distance at 60 km/hour?
 (a) 6 hours (b) 3 hours
 (c) 4 hours (d) $4\frac{1}{2}$ hours
24. A person, who can walk down a hill at the rate of $4\frac{1}{2}$ km/hour, and up the hill at the rate of 3km/hour ascends and comes down to his starting point in 5 hours. How far did he ascend?
 (a) 13.5 km (b) 3 km
 (c) 15 km (d) 9 km
25. A boy runs 20 km in 2.5 hours. How long will he take to run 32 km at double the previous speed?
 (a) 2 hours (b) $2\frac{1}{2}$ hours
 (c) $4\frac{1}{2}$ hours (d) 5 hours
26. A car completes a journey in 10 hours. If it covers half of the journey at 40 kmph and the remaining half at 60 kmph, the distance covered by car is :
 (a) 400 km (b) 480 km
 (c) 380 km (d) 300 km
27. Two cars start at the same time from one point and move along two roads at right angles to each other. Their speeds are 36 km/hour and 48 km hour respectively. After 15 seconds the distance between them will be :
 (a) 400 m (b) 150 m
 (c) 300 m (d) 250 m
28. A runs twice as fast as B and B runs thrice as fast as C. The distance covered by C in 72 minutes, will be covered by A in:
 (a) 18 minutes
 (b) 24 minutes
 (c) 16 minutes
 (d) 12 minutes
29. A truck covers a distance of 550 metres in 1 minute whereas a bus covers a distance of 33 kms in 45 minutes. The ratio of their speeds is:
 (a) 4 : 3 (b) 3 : 5
 (c) 3 : 4 (d) 50 : 3
30. Walking at the rate of 4 km an hour, a man covers a certain distance in 3 hours 45 minutes. If he covers the same distance on cycle, cycling at the rate of 16.5 km/hour, the time taken by him is:
 (a) 55.45 minutes
 (b) 54.55 minutes
 (c) 55.44 minutes
 (d) 45.55 minutes
31. A man can reach a certain place in 30 hours. If he reduces his speed by $\frac{1}{15}$ th, he goes 10 km less in that time. Find his speed per hour :
 (a) 6 km/hr (b) $5\frac{1}{2}$ km/hr
 (c) 4 km/hr (d) 5 km/hr



32. A person started his journey in the morning. At 11 a.m. he covered $\frac{3}{8}$ of the journey and on the same day at 4.30 p.m. he covered $\frac{5}{6}$ of the journey. He started his journey at:
 (a) 6.00 a.m. (b) 3.30 a.m.
 (c) 7.00 a.m. (d) 6.30 a.m.
33. Rakesh yadav and Bhuvnesh start travelling together in the same direction at 8 km/hr and 13 km/hr respectively. After 5 hours Rakesh yadav doubles his speed and Bhuvnesh reduces his speed by 2 km/hr and reached the destination together. How long the entire journey last?
 (a) 10 h (b) 9 h
 (c) $10\frac{1}{2}$ h (d) $9\frac{1}{2}$ h
34. Ajay went on a ten-mile drive of his new imported bike. He started with a certain speed and after covering each mile, his speed is decreased by 20 % for the next mile. If he took 5 minutes to cover the first five mile of the drive, what is the approximate time taken by him to cover the next five miles?
 (a) 14 minutes and 1 seconds
 (b) 15 minutes and 15 seconds
 (c) 16 minutes and 16 seconds
 (d) 17 minutes and 17 seconds
35. A bus meets with an auto at 10 : 00 am while going on the same way in the same direction towards Haridwar. The Bus reach at Haridwar at 12 : 30 p.m. and take 1 hour rest at there. Bus return on the same way and meet with the same auto half an hour later. At what time the Auto will reach at Haridwar:
 (a) 3 pm (b) 4 pm
 (c) 3 : 30 pm (d) 5 pm
36. Rakesh yadav starts from X to Y a 42 km distance with a speed of 60 km/hr. But after every 10 min. he decreases his speed by 6 km/h. How much time did he take to reach at Y:
 (a) 52 minutes (b) 54 minutes
 (c) 55 minutes (d) 53 minutes
37. A student moves $\sqrt{2}x$ km East from his residence and then moves x km North. He then goes x km North-East and finally he takes a turn of 90° towards right and moves a distance x km and reaches his school. What is the shortest distance of the school from his residence?
 (a) $(2\sqrt{2}+1)x$ km (b) $3x$ km
 (c) $2\sqrt{2}x$ km (d) $3\sqrt{2}x$ km
38. The length of the minute hand of a clock is 8 cm. Find the distance travelled by its outer end in 15 minutes:
 (a) 4π cm (b) 8π cm
 (c) 12π cm (d) 16π cm
39. Two swimmers started simultaneously from the beach, one to the south and the other to the East. Two hours later, the distance between them turned out to be 100 km. Find the speed of the faster swimmer, knowing that the speed of one of them was 75 % of the speed of the other:
 (a) 30 kmph (b) 40 kmph
 (c) 45 kmph (d) 60 kmph
40. A wall clock gains 6 minutes in 36 hours, while a table clock loses 2 minutes in 36 hours; both are set right at noon on Tuesday. The correct time when they both show the same time next would be :
 (a) 12 : 30 night (b) 12 noon
 (c) 1 : 30 night (d) 12 night
41. In reaching the Everest, Rakesh Yadav took half as long again to climb the second third as he did to climb the first third and a quarter as long again for the last third as for the second third. He took altogether 5 hrs 50 minutes. Find the time he spent on the first third of the journey?
- (a) 72 min (b) 80 min
 (c) 81 min (d) 88 min
42. The relative speed of minute-hand with-respect to hour-hand is :
 (a) $\left(5\frac{1}{2}\right)^0$ per minute
 (b) $\left(\frac{21}{12}\right)$ minute per minute
 (c) 6° per minute
 (d) $\left(\frac{11}{120}\right)$ per minute
43. Rakesh yadav and Bhuvnesh start from A and B respectively with uniform velocities. Rakesh Yadav is headed towards B and Bhuvnesh towards A and both cities are 600 km apart. Rakesh Yadav rests whenever Bhuvnesh is on the move and Bhuvnesh rest whenever Rakesh yadav is on the move. The speed of Rakesh Yadav and Bhuvnesh is 25km/h and 30 km/h respectively. If Rakesh yadav starts first and reaches B in 36 hours, then find the least time that Bhuvnesh would take to reach his destination after Rakesh Yadav makes a start:
 (a) 20 h (b) 36 h
 (c) 44 h (d) none of these
44. P and Q start running a race on the given track as shown in figure:

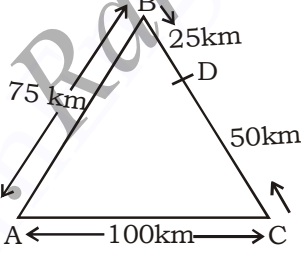


Where AC and BC are mutually perpendicular and CD is the median of triangular paths ABC. BC is 100 km longer than that of AC, and CD is 250 km. The speeds of P and Q are 30 km/h and 40km/h, respectively and their respective paths of running are CADC and CBDC. After how much time they reverse their speeds so that they return C at the same time?



- (a) $\frac{50}{7}$ h (b) $\frac{120}{7}$ h
(c) $\frac{80}{11}$ h (d) none of these
45. A candle of 6 cm long burns at the rate of 5 cm in 5 h and another candle of 8 cm long burns at the rate of 6 cm in 4 h. What is the time required by each candle to remain of equal lengths after burning for some hours, when they start to burn simultaneously with uniform rate of burning?
(a) 1 h (b) 1.5 h
(c) 2 h (d) 4 h
46. Resting 9 hrs. a day Rakesh Yadav travels a certain distance in 40 days. Resting double the time how many days will he take to travel double the distance at double the speed?
(a) 100 (b) 120
(c) 90 (d) 80
47. Resting 4 hrs a day Rakesh Yadav travels a certain distance in 60 days. Resting thrice the time how many days will he take to travel thrice the distance at thrice the speed?
(a) 100 (b) 120
(c) 90 (d) 80
48. A officer goes to office from his home, which is 8 km apart. His speed is 4 km/h. After 5 min the feels that he left some important documents at home. He returns to home and now he travels with fast speed towards the office, and reaches office on time. Find his increase speed?
(a) $4\frac{4}{11}$ km/h (b) $4\frac{9}{11}$ km/h
(c) $3\frac{8}{11}$ km/hr (d) 4 km/hr
49. A cyclist travels 500 km in 4 hours and then he changes his speed and travels 450 km in 5 hours. Then find his second speed is how much percent less than the first speed?
(a) 28 % (b) $38\frac{8}{9}$ %
(c) 30 % (d) 40 %
50. Rakesh yadav can see apprx. d km far from the h metre above high level in sea water. And the relation between d and h is $2d^2 = 25 h$. Then find from how much high level Rakesh yadav can see 10 km?
(a) 8 m (b) 10 m
(c) 16 m (d) 12 m
51. Two men are standing on opposite ends of a bridge of 1200 metres long. If they walk towards each other at the rate of 5m/minute and 10m/minute respectively, in how much time will they meet each other?
(a) 60 minutes (b) 80 minutes
(c) 85 minutes (d) 90 minutes
52. A constable is 114 metres behind a thief. The constable runs 21minute in a metres and the thief 15 metres in a minute, In what time will the constable catch the thief?
(a) 19 minutes (b) 18 minutes
(c) 17 minutes (d) 16 minutes
53. A walks at a uniform rate of 4 km an hour; and 4 hours after his start, B bicycles after him at the uniform rate of 10 km an hour. How far from the starting point will B catch A?
(a) 16.7 km (b) 18.6 km
(c) 21.5 km (d) 26.7 km
54. A train starts from A at 7 a.m. towards B with speed 50 km/h. Another train from B starts at 8 a.m. with speed 60 km/h towards A. Both of them meet at 10 a.m. at C. The ratio of the distance AC to BC is :
(a) 5 : 6 (b) 5 : 4
(c) 6 : 5 (d) 4 : 5
55. A thief, who was chased by a policeman was 100 metres ahead of the policeman initially. If the ratio between speeds of the policeman and the thief is 5 : 4, then how long thief would have covered before he was caught by the policeman?
(a) 80 m (b) 200 m
(c) 400 m (d) 600 m
56. A jeep is chasing a car which is 5 km ahead. Their respective speeds are 90 km/hr and 75 km/hr. After how many minutes will the jeep catch the car?
(a) 18 (b) 20
(c) 24 (d) 25
57. P and Q are 27 km away. Two trains with speeds of 24 km/hr and 18 km/hr respectively start simultaneously from P and Q and travel in the same direction. They meet at a point R beyond Q. Distance QR is:
(a) 126 km (b) 81 km
(c) 48 km (d) 36 km
58. A thief is noticed by a policeman from a distance of 200 m. The thief starts running and the policeman chases him. The thief and the policeman run at the rate of 10 km per hour and 11 k.m. per hour respectively. What is the distance between them after 6 minutes?
(a) 100 m (b) 190 m
(c) 200 m (d) 150 m
59. A tiger is 50 of its own leaps behind a deer. The tiger takes 5 leaps per minute to the deer's 4. If the tiger and the deer cover 8m and 5m per leap respectively, what distance will the tiger have to run before it catches the deer?
(a) 600 m (b) 700 m
(c) 800 m (d) 1000 m
60. Two men start walking from A and B, 72 km distance toward each other at same time. The speed of first person is 4 km/h. While the other one starts at 2 km/h and increases his speed every hour by $\frac{1}{2}$ km/h when will they meet?



- (a) after 9 hrs (b) after 12 hrs
(c) after 8 hrs (d) after 10 hrs
61. Two car start from same place at same time. Speed of first car is 10 km/h and the speed of IInd car is 8 km/h and it increase its speed $\frac{1}{2}$ km/h after each hour. After how much distance the second overtake the first :
(a) 90 km (b) 100 km
(c) 180 km (d) none of these
62. A hound is chasing a rabbit, initially the rabbit was 125 his own leaps ahead the Hound. A hound takes 3 leaps for every 4 leaps of a rabbit. A rabbit and a hound covers 1.75 m and 2.75 m distance in a leap respectively. Then in how many leaps the hound will catch the rabbit?
(a) 525 (b) 625
(c) 425 (d) none of these
63. A man can see 400 m in a fog. When he was travelling at a speed of 4 km/hr, he saw a train was coming behind him which was passing by the side of man and disappeared after 3 minutes. If the length of train is 200 m then find the speed of the train?
(a) 24 km/h (b) 36 km/h
(c) 48 km/h (d) 12 km/h
64. A hare was 180 m ahead from a hound after seeing the hound, hare started running at 9 km/h. After 1 min the hound started chasing the hare at a speed of 12 km/h. Find the distance travelled by the hound if the hound will catch the hare from the place where the hound standing?
(a) 1320 m (b) 800 m
(c) 1140 m (d) 1350 m
65. A hare is 400 his own leaps ahead from a hound. A hound takes 4 leaps for every 6 leaps of a hare. The hare and a hound covers the distance in one leap 1.5m and 2.5 m respectively. Then find how many leaps will the hound take to catch the hare :
(a) 2400 (b) 1800
(c) 1200 (d) 1600
66. A car driver is driving a car at a speed of 60 km/hr, and he saw a bus 175 m ahead which is 125 m behind after 54 seconds. Then find the speed of bus?
(a) 40 km/h (b) 40.5 km/h
(c) 50.5 km/h (d) 60.5 km/h
67. A triangular track showed in the given figure. Two men P and Q start at the same time from A and reaches to D. It is found that P reaches to D, 1 hour later than Q. If P and Q replaces his speed then P reaches to D $2\frac{2}{3}$ hours later than Q. Then find the speed of P and Q :
- 
- (a) 30 km/h, 25 km/h
(b) 40 km/h, 15 km/h
(c) 20 km/h, 35 km/h
(d) 28 km/h, 27 km/h
68. Two men start at the same time in opposite direction from A and B which is 135 km apart. A man who is moving from A to B travels 12.5 km in first hr, 11.5 km in second hour, 10.5 km in IIIrd hour and moving ahead in the same way. The other man who is moving ahead from B to A travels 15 km in first hour, 14 km in second hour, 13 km in third hr and moving ahead in the same way. After how many hours and how much distance from A they will meet each other?
- (a) 6 hours, 60 km
(b) 5 hours, 65 km
(c) 3 hours, 20km
(d) none of these
69. A pedestrian and cyclist start simultaneously towards each other from A and B which are 40 km apart and meet 2 hours after the start. Then they resumed their trips and the cyclist arrives at A, 7 hours 30 minutes earlier than the pedestrian arrives at B. Which of these could be the speed of the pedestrian?
(a) 4 km/h (b) 5 km/h
(c) 3 km/h (d) 6 km/h
70. Two ants start simultaneously from two ant holes towards each other. The first ant covers 8% of the distance between the two ant holes in 3 hours, the second ant covered $7/120$ of the distance in 2 hours 30 minutes. Find the speed (feet/h) of the second ant if the first ant travelled 800 feet to the meeting point :
(a) 15 feet/h (b) 25 feet/h
(c) 45 feet/h (d) 35 feet/h
71. Karim, a tourist leaves Delhi on a bicycle. Having travelled for 1.5 h at 16 km/h, he makes a stop for 1.5 h and then pedals on with the same speed. Four hours after Karim started, his friend and local guide Rahim leaves Delhi on a motorcycle and rides with a speed of 28 km/h in the same direction as Karim had gone. What distance will they cover before Rahim overtakes Karim:
(a) 88 km (b) 90.33 km
(c) 93.33 km (d) 96.66 km/s
72. A cyclist left point A for point B and travelled at the constant speed of 25 km/h. When he covered the distance of 8.33 km, he was overtaken by a car that left point A, 12 minutes after the cyclist and travelled at a constant speed too. When the cyclist travelled another 30 km, he encountered the car returning from B. Assume that the car did not stop at point B. Find the distance between A and B :
(a) 39.5833 km (b) 41.0833 km
(c) 60.833 km (d) 83.33 km



73. Two cars left points A and B simultaneously, travelling towards each other. 9 hours after their meeting, the car travelling from A arrived at B, and 16 hours after their meeting, the car travelling from B arrived at A. How many hours did it take the slower car to cover the whole distance ?
 (a) 36 hours (b) 21 hours
 (c) 25 hours (d) 28 hours
74. Amar and Akbar left Delhi simultaneously and travelled towards Goa. Amar's speed was 15 km/h and that of Akbar was 12 km/h. Half an hour later, Anthony left Delhi and travelled in the same direction. Some time later, he overtook Akbar 90 minutes after he overtook Amar. Find Anthony's speed :
 (a) 18 kmph (b) 24 kmph
 (c) 20 kmph (d) 16 kmph
75. The distance between A and B is 220 km. Two buses start from these towns towards each other. They can meet halfway if the first bus leaves 2 hrs earlier than the second. If they start simultaneously, they will meet in 4 hours. Find the speeds of the buses when time is maximum :
 (a) $17.5 (3 + \sqrt{5})$ km/h, $17.5(1+\sqrt{5})$ km/h
 (b) $27.5 (3 + \sqrt{5})$ km/h, $27.5(1 + \sqrt{5})$ km/h
 (c) $27.5 (3 - \sqrt{5})$ km/h, $27.5(\sqrt{5} - 1)$ km/h
 (d) None of these
76. A man goes from Mysore to Bangalore at a uniform speed of 40 km/hr and comes back to Mysore at a uniform speed of 60 km/hr. His average speed for the whole journey is
 (a) 48 km/hr (b) 50 km/hr
 (c) 54 km/hr (d) 55 km/hr
77. A man completes 30 km of a journey at the speed of 6 km/hr and the remaining 40 km of the journey in 8 hours. His average speed for the whole journey is :
 (a) 7 km/hour
 (b) $5\frac{5}{13}$ km/hour
 (c) $\frac{16}{27}$ km/hour
 (d) $\frac{27}{16}$ km/hour
78. A man goes from A to B at 10 km/h and comes back at 20 km/h. He further goes from A to B at 30 km/h. Find his average speed :
 (a) $16\frac{4}{11}$ km/hr
 (b) $15\frac{4}{11}$ km/hr
 (c) $14\frac{4}{11}$ km/hr
 (d) 15 km/hr
79. A man completed a certain journey by a car. If he covered 30 % of the distance at the speed of 20 km/hr, 60 % of the distance at 40 km/hr and the remaining distance at 10 km/hr his average speed for the whole journey was :
 (a) 25 km/hr (b) 28 km/hr
 (c) 30 km/hr (d) 33 km/hr
80. A man travels 40 km by train at 20 km/hr, 60 km by car at 10 km/h, 30 km by bus at 15 km/h, 80 km by aeroplane at 25 km/h and 120 km by ship at 30 km/hr. Then find out the average speed of man during the entire journey, and also find out in how many hours he can travel 825 km distance by the same average speed?
 (a) $19\frac{8}{43}$ km/h, 43 hours
 (b) $19\frac{8}{43}$ km/h, 44 hours
 (c) $19\frac{8}{43}$ km/h, 40 hours
 (d) None of these
81. A bus travels P to Q which is 70 km apart in such a way- first 15 km at a speed of 10 km/h, second 10 km at a speed of 15 km/h, third 20 km at 20 km/h and the last 25 km at a speed of 25 km/h. And returns from Q to P at the same speed which is $\frac{5}{12}$ of previous average speed. Then find in how many hours the returning journey will complete?
 (a) 10 hours (b) 20 hours
 (c) 30 hours (d) 25 hours
82. A man has to travel 200 km. In starting he travels 50 km at a speed of 40 km/h. After this every 50 km he travels 5 km/h faster than the previous speed. At the time of returning first 50 km he travels at a speed of 10 km/hr. After this every 50 km he travels 10 km/h faster than the previous speed. Then find the average speed of the man during the whole journey?
 (a) 27.5 km/h
 (b) 25.5 km/h
 (c) 31.5 km/h
 (d) None of these
83. A car travels from A to B at V_1 km/h, travels back from B to A at V_2 km/h and again goes back from A to B at V_2 km/h. The average speed of the car is:
 (a) $\frac{2V_1V_2}{V_1+2V_2}$ (b) $\frac{2V_1V_2}{V_2+2V_1}$
 (c) $\frac{3V_1V_2}{V_2+2V_1}$ (d) $\frac{3V_1V_2}{V_1+2V_2}$
84. A and B are two friends. A lives at a place P and B lives at another place Q. Everyday A goes to Q to meet B at 120 km/h. Thus, he takes 3 hours. On a particular day B started to meet A so he moved towards P. On that day A took only 2 hours to meet B on the way instead at Q.



- (i) What is the ratio of the speeds of A is B?
 (ii) What is the speed of B?
 (a) 2 : 1, 60 km/h
 (b) 3 : 1, 40 km/hr
 (c) 4 : 1, 30 km/hr
 (d) None of these
85. Two horses start trotting towards each other, one from A to B and another from B to A. They cross each other after one hour and the first horse reaches B, $\frac{5}{6}$ hours before the second horse reaches A. If the distance between A and B is 50 km. What is the speed of the slower horse?
 (a) 30 km/h (b) 15 km/h
 (c) 25 km/h (d) 20 km/h
86. Rakesh Yadav and Bhuvnesh leave towns Kolkata and Ambala at 6 am and travel towards Ambala and Kolkata respectively. Speed of Rakesh Yadav is 60 km/h and speed of Bhuvnesh is 120 km/h. Pawan leaves Kolkata for Ambala sometime later and travels at a speed of 90 km/h. If the distance between Kolkata and Ambala is 1080 km and all three meet at the same point on the way, at same time, then at what time did pawan leave Kolkata?
 (a) 7 am (b) 8 am
 (c) 7 : 30 am (d) 10 am
87. Rakesh yadav and Bhuvnesh started from two places A and B towards B and A respectively at 8 : 20 am. The speeds of Rakesh yadav and Bhuvnesh are in the ratio of 4 : 5. They meet at C, somewhere between A and B, spent some-time together enjoyed tea and Samosa and then both started towards their destination at 9 : 27 am. If Rakesh yadav reaches B at 10 : 32 am, how much time did they spend together?
 (a) 8 min (b) 12 min
 (c) 15 min
 (d) can't be determined
88. Rakesh Yadav and Bhuvnesh start from A and B towards B and A respectively, at the same time. After they meet at C on the way from A to B, Rakesh Yadav reduces his speed by 33.33% and returns to A and Bhuvnesh increases his speed by 33.33% and returns to B. If Rakesh yadav takes 2 hours for the entire journey, what is the time taken by Bhuvnesh for the entire journey?
 (a) 96 min (b) 84 min
 (c) 168 min
 (d) can't be determined
89. A dog is 50 of its own leaps behind a cat. The dog takes 5 leaps per minute to the cat's 4. If the dog and the cat cover 8 m and 5 m per leap respectively, what distance will the dog have to run before it catches the cat?
 (a) 600 m (b) 700 m
 (c) 800 m (d) 1000 m
90. A thief sees a jeep at a distance of 250 m, coming towards him at 36 km/h. Thief takes 5 seconds to realise that there is nothing but the police is approaching him by the jeep and start running away from police at 54 km/h. But police realise after 10 seconds, when the thief starts running away, that he is actually a thief and gives chase at 72 km/h. How long after thief saw police did police catchup with him and what is the distance police had to travel to do so?
 (a) 50 sec, 1000 m
 (b) 65 sec, 1150 m
 (c) 65 sec, 1300 m
 (d) 45 sec, 1050 m
91. In a circus there was a leopard and a tiger walking in the two different rings of same radii. There I observed that when leopard moved 3 steps, tiger moved 5 steps in the same time, but the distance travelled by leopard in 4 steps is equal to the distance travelled by tiger in 5 steps. What is the number of rounds that a leopard made when tiger completed 100 rounds?
 (a) 120 (b) 48
 (c) 75 (d) none of these
92. A car completes a journey in 10 hours. If it covers half of the journey at 40 kmph and the remaining half at 60 kmph, the distance covered by car is:
 (a) 400 km (b) 480 km
 (c) 380 km (d) 300 km
93. A certain distance is covered by a vehicle at a certain speed. If half of this distance is covered by another vehicle in double the time, the ratio of the speeds of the two vehicles is:
 (a) 1 : 4 (b) 1 : 2
 (c) 2 : 1 (d) 4 : 1
94. A tourist covered a journey partly by foot and partly by tonga. He walked for 90 km and rode the tonga for 10 km. He spent 4 h less on the tonga than on walking. If the tourist had reversed the time he travelled by foot and on tonga, the distances travelled on each part of the journey would be equal. How long did he ride the tonga ?
 (a) He rode for 6 hours
 (b) He rode for 4 hours
 (c) He rode for 2 hours
 (d) He rode for 5 hours
95. An ant moved for several seconds and covered 3 mm in the first second and 4 mm more in each successive second than in its predecessor. If the ant had covered 1 mm in the first second and 8 mm more in each successive, then the difference between the path it would be more than 6 mm but less than 30 mm. Find the time for which the ant moved (in seconds)
 (a) 5 s (b) 4 s
 (c) 6 s (d) 2 s
96. A motorcyclist rode the first half of his way at a constant speed. Then he was delayed for 5 minutes and therefore, to make up for the lost time he increased his speed by 10 km/h. Find the initial speed of the motorcyclist if the total path covered by him is equal to 50 km:
 (a) 36 km/h (b) 48 km/h
 (c) 50 km/h (d) 62 km/h



97. I walk a certain distance and ride back taking a total time of 37 minutes. I could walk both ways in 55 minutes. How long would it take me to ride both ways?
(a) 9.5 min. (b) 19 min.
(c) 18 min. (d) 20 min.
98. A man walks a certain distance and rides back in 4 hours 30 minutes. He could ride both ways in 3 hours. The time required by the man to walk both ways is:
(a) 4 hours 30 minutes
(b) 4 hours 45 minutes
(c) 5 hours
(d) 6 hours
99. A man takes 6 hours 15 minutes in walking a distance and riding back to the starting place. He could walk both ways in 7 hours 45 minutes. The time taken by him to ride both ways, is:
(a) 4 hours
(b) 4 hours 30 minutes
(c) 4 hours 45 minutes
(d) 5 hours
100. Rakesh yadav rides on bicycle at 8 km/hour and reaches his school 2.5 minutes late. The next day he increases his speed to 10 km/hour and reaches school 5 minutes early. How far is the school from his house?
(a) $\frac{5}{8}$ km (b) 8 km
(c) 5 km (d) 10 km
101. Rakesh Yadav covered a certain distance at some speed. Had he moved 3 km per hour faster, he would have taken 40 minutes less. If he had moved 2 km per hour slower, he would have taken 40 minutes more. The distance (in km) is :
(a) 20 km (b) 35 km
(c) $36\frac{2}{3}$ km (d) 40 km
102. Ram arrives at a Bank 15 minutes earlier than scheduled time if he drives his car at 42 km/h. If he drives car at 35 km/h he arrives 5 minutes late. The distance of the Bank, from his starting point is :
(a) 70 km (b) 210 km
(c) 72 km (d) 60 km
103. A boy is late by 9 minutes if he walks to school at a speed of 4 km/hour. If he walks at the rate of 5 km/hour, he arrives 9 minutes early. The distance to his school is :
(a) 9 km (b) 5 km
(c) 4 km (d) 6 km
104. Bhuvnesh goes to his office by scooter at a speed of 30 km/h and reaches 6 minutes earlier. If he goes at a speed of 24 km/h, he reaches 5 minutes late. The distance of his office is:
(a) 20 km (b) 21 km
(c) 22 km (d) 24 km
105. Walking at 5 km/hr a student reaches his school from his house 15 minutes early and walking at 3 km/hr he is late by 9 minutes. What is the distance between his school and his house ?
(a) 5 km (b) 8 km
(c) 3 km (d) 2 km
106. A student goes to school at the rate of $2\frac{1}{2}$ km/h and reaches 6 minutes late. If he travels at the speed of 3 km/h. he is 10 minutes early. The distance (in km) between the school and his house is :
(a) 5 km (b) 4 km
(c) 3 km (d) 1 km
107. If I walk at 5 km/hour. I miss a train by 7 minutes. If however, I walk at 6 km/hour, I reach the station 5 minutes before the departure of the train. The distance (in km) between my house and the station is:
(a) 6 km (b) 5 km
(c) 4 km (d) 3 km
108. A man has to be at a certain place at a certain time. He finds that he shall be 20 minutes late if he walks at a speed of 3 km/hour and 10 minutes earlier if he walks at a speed of 4 km/hour. The distance he has to walk is :
(a) 24 km (b) 12.5 km
(c) 10 km (d) 6 km
109. When a person cycled at 10 km per hour he arrived at his office 6 minutes late. He arrived 6 minutes early, when he increased his speed by 2 km per hour. The distance of his office from the starting place is:
(a) 6 km (b) 7 km
(c) 12 km (d) 16 km
110. If A student runs 5 km/h then he becomes 10 min late to school, but if he increases his speed by 1 km/h, then he becomes only 5 min late. Find his normal speed to reach there on time :
(a) 7.5 km/hr (b) 5 km/hr
(c) 10 km/hr (d) 6 km/hr
111. If a man runs at 10 km/h, then he arrives at a certain place at 1 p.m. But if increases his speed by 5 km/h then he reach at there at 11 a.m. At what speed must he runs to get there at noon :
(a) 13 km/hr (b) 16 km/hr
(c) 14 km/hr (d) 12 km/hr
112. A man covers a certain distance by his car. If he moved 6 km/h faster then he takes 4 hour less and If he had moved 4 km/h slower then he would have taken 4 hours more. Find his distance:
(a) 480 km (b) 240 km
(c) 380 km (d) 120 km
113. If a man moves at 2 km/h faster than he takes 60 minute less and if he had moved 1 km/h slower than he takes 40 minutes more. Find his distance :
(a) 80 km (b) 40 km
(c) 60 km (d) none of these



114. Rakesh yadav started for the station half a km from his home walking at 1 km/h to catch the train on time. After 3 minutes he realise that he had forgotten some important documents at home and returned with increased, but constant speed to get it succeeded in catching the train. Find his latter speed in km/h:
- (a) 1.25 km/hr (b) 1.1 km/hr
(c) 11/9 km/hr (d) 2 km/hr
115. A car travels 140 km partly at a speed of 6 km/h and the remaining at a speed of 10 km/h. If it reverses the speeds, then it travels 8 km more in the same time. Then find the time took by car to travel 140 km and also find what was the average speed of the car?
- (a) 18 hrs, $7\frac{7}{9}$ km/h
(b) 16 hrs, $8\frac{7}{9}$ km/h
(c) 9 hrs, $7\frac{7}{9}$ km/h
(d) 8 hrs, $8\frac{7}{9}$ km/h
116. A bus travels a certain distance with the uniform speed. If the speed of bus is 7 km/h more then time taken to travel the same distance is 1 hour less. If the speed of the bus is 5 km/h less then time will be 1 hour more. Then find the distance and the time taken to travel the distance with a uniform speed, and also find what is the speed of the bus?
- (a) 210 km, 6 hrs, 35 km/h
(b) 140 km, 8 hrs, 35 km/h
(c) 210 km, 6 hrs, 45 km/h
(d) none of these
117. Rakesh Yadav travels a certain distance by cycle. If he travels 2 km/h faster, then he reaches 60 minutes before the time. If he travels 1 km/h slower then he reaches 40 minutes late. Find the distance and the original speed by Rakesh Yadav?
- (a) 60 km, 10 km/h
(b) 70 km, 20 km/h
(c) 75 km, 25 km/h
(d) none of these
118. Two places A and B are 300 km apart from the place A, a car and a scooter start at the same time towards B. The car travels $\frac{2}{3}$ rd of the total distance with a certain speed and after this it stops for 10 minutes. After this it travels the remaining distance at $\frac{3}{4}$ th of the speed. The scooter travels $\frac{1}{3}$ rd of the total distance at a certain speed, and then stops for half an hour. And the remaining distance it travels at 100 % more than the previous speed. Thus both reach to B at the same time. If the speed of the car is 15 km/h more than the scooter then find the initial speed of car and the scooter, and also find if they starts at 7 : 00 am from A then at what time will they reach to B ?
- (a) 40 km/h, 25 km/h, 3:30 pm
(b) 35 km/h, 30 km/h, 3 : 30 pm
(c) 45 km/h, 20 km/h, 2 : 30 pm
(d) 40 km/h, 25 km/h, 2 : 30 pm
119. A car travels for 14 hours. It travels partly at 40 km/h and the remaining at 60 km/h. If it travels former distance at 45 km/hr and latter distance at 75 km/h then it reaches 2 hours early. Then find the distance travelled by car, and also find if it travels the whole journey with a uniform speed, then what would be the speed?
- (a) 660 km, $47\frac{1}{7}$ km/h
(b) 660 km, $47\frac{3}{7}$ km/h
(c) 560 km, $42\frac{3}{7}$ km/h
(d) none of these
120. Rakesh Yadav travels one-third of his journey at a speed of 10 km/h, next one-third at a speed of 6 km/h and the remaining distance he travels at a speed of 7.5 km/h. If he travels half of the distance at 9 km/h and the remaining half distance at 5 km/h, then he will take two hours more time. Then find how much distance he travelled ?
- (a) 90 km (b) 100 km
(c) 120 km (d) 150 km
121. Bhuvnesh travels 79 km in 13 hours. Some part of the total distance he travelled on foot at a speed of 5 km/h and the remaining distance travelled by cycle at a speed of 7 km/h. Then find the distance travelled by the cycle ?
- (a) 49 km (b) 98 km
(c) 147 km (d) 14 km
122. Rakesh Yadav goes to Chennai from his Bungalow, which is 800 km apart. Initially 250 km he travels by car and the remaining by train. He takes 27 hours to cover whole journey. If he travels 300 km by car and the remaining by train then he takes 1 hour less. Then find the speed of the car and the train respectively ?
- (a) 50 km/h, 25 km/h
(b) 40 km/h, 35 km/h
(c) 60 km/h, 15 km/h
(d) none of these
123. Rakesh Yadav has to travel 65 km. He travels the first 20 km on foot at a speed of 5 km/h and the remaining by car. If he travels the first 27 km by car and the remaining at speed of 5 km/h on foot then he takes 1 hour 36 min more time. Then find the speed of the car ?
- (a) 9 km/h (b) 13 km/h
(c) 18 km/h (d) none of these
124. A bus travels 700 km at a certain speed. If the bus driver reduces the speed of bus by 20 km/h then the bus will take four hours more to travel the same distance. Then find the initial speed of the bus ?
- (a) 70 km/h (b) 50 km/h
(c) 90 km/h (d) 110 km/h



125. Rakesh Yadav when goes to city at a speed of 10 km/h then he reaches 5 minutes late. But when he goes 15 km/h he reaches 2.5 min earlier. Find the distance between home and the city at what speed should he travel to reach on time ?
- (a) $3\frac{3}{4}$ km, $12\frac{6}{7}$ km/h
 (b) $3\frac{3}{4}$ km, $11\frac{6}{7}$ km/h
 (c) $2\frac{3}{4}$ km, $12\frac{6}{7}$ km/h
 (d) None of these
126. Rakesh Yadav when goes to city at a speed of 60 km/h then he reaches 6 mins late. The next day he increases his speed 20 km/h and reaches 4 minutes earlier ?
- (i) Distance between home to city.
 (ii) How much time should he take to reach the city.
 (iii) If he wants to reach the city on time then at what speed he should travel?
- (a) 40 km, 34 min, $70\frac{10}{17}$ km/h
 (b) 80 km, 60min, $70\frac{10}{17}$ km/h
 (c) 55 km, 45 min, $68\frac{10}{17}$ km/h
 (d) None of these
127. Two joggers left Delhi for Noida simultaneously. The first jogger stopped 42 min later when he was 1 km short of Noida and the other one stopped 52 min later when he was 2 km short of Noida. If the first jogger jogged as many kilometres as the second, and the second as many kilometres
- as the first, the first one would need 17 min less than the second. Find the distance between Delhi and Noida?
- (a) 5 km (b) 15 km
 (c) 25 km (d) 35 km
128. A motorcyclist left point A for point B. Two hours later, another motorcyclist left A for B and arrived at B at the same time as the first motorcyclist. Had both the motorcyclists started simultaneously from A and B travelling towards each other, they would have met in 80 minutes. How much time did it take the faster motorcyclist to travel from A to B?
- (a) 6 hours (b) 3 hours
 (c) 2 hours (d) 4 hours
129. Two people started simultaneously towards each other from A and B, which are 60 km apart. They met 5 hours later. After their meeting, the first person, who travelled from A to B, decreased his speed by 1.5 km/h and the other person, who travelled from B to A, increased his speed by 1.5 km/h. The first person is known to arrive at B 2.5 hours earlier than the second person arrived at A. Find the initial speed of the first person :
- (a) 4.5 km/h (b) 6 km/h
 (c) 7.5 km/h (d) 9 km/h
130. Two friends started walking simultaneously from points A and B towards each other. 144 minutes later the distance between them was 20% of the original distance. How many hours does it take the faster walker to cover the distance AB if he needs eight hours less to travel the distance than his friend (assume all times to be in whole numbers and in hours) ?
- (a) 3 hours (b) 6 hours
 (c) 12 hours (d) 4 hours
131. A pedestrian and a cyclist left A for B at the same time. Having reached B, the cyclist turned back and met the pedestrian an hour after the start. After their meeting, the pedestrian continued his trip to B and the cyclist turned back and also headed for B. Having reached B the cyclist turned back again and met the pedestrian 30 mins after their first meeting. Determine what time it takes the pedestrian to cover the distance between A and B :
- (a) 1 hour (b) 2 hours
 (c) 2.5 hours (d) 3 hours
132. Two people started simultaneously from points A and B towards each other. At the moment the person who started from A had covered two-thirds of the way, the other person had covered 2 km less than half the total distance. If it is known that when the person who started from B had covered $\frac{1}{4}$ of the way, the other person was 3 km short of the mid point. Find the distance between A and B. The speeds of the two people were constant :
- (a) $(15-3\sqrt{17})$ km
 (b) $(15+3\sqrt{17})$ km
 (c) Both a and b
 (d) $3\sqrt{17} - 15$
133. Rohit left A for B at 6 a.m. An hour and a half later Vimal, whose speed was 5 km/h higher than that of Rohit left A. At 10 : 30 p.m. of the same day the distance between the two friends was 21 km. Find the speed of Vimal :
- (a) 40 kmph
 (b) 41 kmph
 (c) 69 kmph
 (d) Either b or c
134. A car travelled first 36 km at 6 km/h faster than the usual speed, but it returned the same distance at 6 km/h slower than the usual speed. If the total time taken by car is 8 hours, for how many hours does it travelled at the faster speed?
- (a) 4 hours
 (b) 3 hours
 (c) 2 hours
 (d) 1 hour



135. Walking at four-fifths of his usual speed Rakesh Yadav reached his office 15 minutes late on a particular day. The next day, he walked at $\frac{5}{4}$ of his usual speed. How early would he be to the office when compared with the previous day ?
 (a) 27 min (b) 32 min
 (c) 30 min (d) none of these
136. The speed of a car during the second hour of its journey is thrice that in the first hour. Also its third hours speed is the average speed of the first two hours. Had the car travelled at the second hours speed during all the first three hours, then it would have travelled 150 km more. Find the percentage reduction in time in the second case for the first three hours:
 (a) $33\frac{1}{3}\%$ (b) 40 %
 (c) 25 % (d) 50 %
137. Soniya and Priyanka started from A and B for B and A, which are 645 km apart. They meet after 15 hours. After their meeting, Sonia increased her speed by 3 km/h and Priyanka reduced her speed by 3 km/h, they arrived at B and A respectively at the same time. What is their initial speeds ?
 (a) 24 km/h and 30 km/h
 (b) 25 km/h and 18 km/h
 (c) 18 km/h and 21 km/h
 (d) 20 km/h and 23 km/h
138. An urgent message had to be delivered from the house of the A in Pune to B who was camping in Bangalore. A horse rider travels on horse back from Pune to Bangalore at a constant speed. If the horse increased its speed by 6 km/h, it would take the rider 4 hours less to cover that distance. And travelling with a speed 6 km/h lower than the initial speed, it would take him 10 hours more than the time he would have taken had he travelled at a speed 6 kmph higher than the initial speed. Find the distance between Pune and Bangalore :
 (a) 120 km (b) 600 km
 (c) 720 km (d) 750 km
139. Rakesh Yadav had to cover a distance of 60 km. However, he started 6 minutes later than his scheduled time and raced at speed 1 km/h higher than his originally planned speed and reached the finish at the time he would reach it if he began to race strictly at the appointed time and raced with the assumed speed. Find the speed at which he travelled during the journey described :
 (a) 25 km/h (b) 15 km/h
 (c) 10 km/h (d) 6 km/h
140. Rakesh Yadav covered a distance of 96 km two hours faster than he had planned to. This he achieved by travelling 1 km more every hour that he intended to cover every 1 hour 15 minutes. What was the speed at which Rakesh Yadav travelled during the journey?
 (a) 16 km/h (b) 26 km/h
 (c) 36 km/h (d) 30 km/h
141. The difference between the times taken by two buses to travel a distance of 350 km is 2 hours 20 minutes. If the difference between their speeds is 5 kmph, find the slower speed:
 (a) 35 kmph (b) 30 kmph
 (c) 25 kmph (d) 20 kmph
142. Three cars started simultaneously from A to B along the same highway. The second car travelled with a speed that was 10 km/hr higher than the first car's speed and arrived at B 1 hour earlier than the first car. The third car arrived at B 33.33 minutes earlier than the first car, travelling half the time at the speed of the first car and the other half at the speed of the second car. Find the total distance covered by these cars during their journey between A and B :
 (a) 360 km (b) 600 km
 (c) 540 km (d) 840 km
143. A long distance is covered by Rakesh Yadav in 5 hours. He covers $\frac{3}{4}$ of it at 12 km/hr and the remaining at 16 km/hr. Find the total distance.
 (a) 64 km (b) 128 km
 (c) 32 km (d) 45 km
144. Rakesh Yadav drives his car very fast at 360 m/s. Moving ahead for some hours he finds some problem in headlights of the car. So he takes 20 seconds in changing the bulb of the headlight by stopping the car. Mean while he notices that another car which was 400 m back is now 200 m ahead of his car. What is the speed of this car?
 (a) 100 km/h (b) 92 km/h
 (c) 108 km/h (d) 300 km/h
145. A thief goes away with a Maruti car at a speed of 40 km/hr. The theft has been discovered after half an hour and the owner sets off in another car at 50 km/hr. When will the owner overtake the thief from the start ?
 (a) 2 hours (b) 6 hours
 (c) 4 hours (d) None of these
146. One bad day, at 7 a.m. I started on my bike at the speed of 36 kmph to meet one of my relatives. After I had travelled some distance, my bike went out of order and I had to stop. After resting for 35 minutes, I returned home on foot at a speed of 14 kmph and reached home at 1 p.m. Find the distance from my house at which my bike broke down :
 (a) 54.6 km (b) 63 km
 (c) 72 km (d) None of these
147. When a bus stops at different stations then its average speed is 40 km/h. But when it travels without stoppage the average speed of the bus is 50 km/h. Then find how many minutes the bus stops in an hour?
 (a) 12 min (b) 15 min
 (c) 25 min (d) 10 min



148. A bus is moving with a uniform speed travels a certain distance in a certain time. The speed of the bus is directly proportional to the distance travelled and inversely proportional to the square root of time. It travels 60 km in 4 hours at a speed of 40 km/h. Then find how much distance will travel in 9 hours at a speed of 44 km/h ?
 (a) 70 km (b) 89 km
 (c) 90 km (d) 99 km
149. A circular track has radius equal to 7 m. Two boys Shobhit and Bhuvnesh start simultaneously to run along the track from a point A. Shobhit runs in clockwise while Bhuvnesh runs in anti-clockwise direction. If by the time two meet for the fifth time, Shobhit had run 140 m, then what is the ratio of speeds of Shobhit and Bhuvnesh?
 (a) 4 : 7 (b) 3 : 7
 (c) 7 : 3 (d) 7 : 4
150. Two places A and B are 750 km apart from place A, a car and a bus start at the same time towards B. The speed of the car is 15 km/h more than the speed of the bus. The bus travels $\frac{2}{3}$ rd parts of the total distance with its initial speed, after this it stops for 20 min. After this its speed changes to $\frac{4}{5}$ of its original speed and it travels the remaining distance with this speed. The car travels $\frac{1}{3}$ rd part of the total distance with its initial speed, and after this stops for 40 min, after this its speed reduced by $\frac{1}{6}$ of the original speed and travels the remaining distance with this speed. If the car reaches $1\frac{1}{18}$ hours earlier than B. Then find the initial speeds of the car and the bus. And also find if the bus starts at 10 am then at what time will it reach to B?
 (a) 90 km/h, 75 km/h, 9 : 10 pm
 (b) 80 km/h, 75 km/h, 9 : 10 am
 (c) 90 km/h, 80 km/h, 11 : 10 pm
 (d) None of these
151. Three persons A, B and C can travel with a speed of 3 km/hr, 4 km/hr and 5 km/hr respectively. They travel from the same place respectively at 7, 8 and 9 o'clock. When B meets A, B sends him back with a message to C. When will C get the message and how much distance will he have travelled ?
 (a) 11:15 o'clock, $11\frac{1}{4}$ km
 (b) 12 o'clock, 12.5 km
 (c) 11 o'clock, 10 km
 (d) none of these
152. A, B and C can walk at the rates of 6, 8 and 10 km/h respectively. They start from the same place at 2, 4 and 6 pm in the evening in the same direction respectively. When B catches A, B sends him back with a message to C. When will C get the message?
 (a) 10 : 30pm (b) 8 : 30 pm
 (c) 9 : 30pm (d) 11 : 30 pm
153. A bus left point X for point Y. Two hours later a car left point X for Y and arrived at Y at the same time as the bus. If the car and the bus left simultaneously from the opposite ends X and Y towards each other, they would meet 1.33 hours after the start. How much time did it take the bus to travel from X to Y ?
 (a) 2 h (b) 4 h
 (c) 6 h (d) 8 h
154. Two cities A and B are 450 km apart. A car and a bus move from city A to city B, and the speed of the car is 20 km/h more than the bus. After travelling two-thirds of the distance the car stops for two hours, and after this it travels the remaining distance at two-thirds of the speed and reaches to destination, and after travelling $\frac{1}{3}$ rd of the distance the bus stops for one hour. And after this it travels the remaining distance 25 % more than the previous speed, and reaches the destination B at the same time as the car :
 (i) Find the speed of the car.
 (ii) Find the speed of the bus.
 (iii) Find the time taken during the whole journey.
 (a) 60 km/h, 40 km/h, 10 hr 45min
 (b) 80 km/h, 20 km/h, 10 hr 45min
 (c) 55 km/h, 45 km/h, 11 hr 45min
 (d) 75 km/h, 25 km/h, 10 hr 45min
155. Two horses started simultaneously towards each other and meet each other 3 h 20 min later. How much time will it take the slower horse to cover the whole distance if the first arrived at the place of departure of the second 5 hours later than the second arrived at the point of departure of the first?
 (a) 10 hours (b) 5 hours
 (c) 15 hours (d) 6 hours
156. A train 180 m long moving at the speed of 20 m/sec overtakes a man moving at a speed of 10 m/sec in the same direction. The train passes the man in :
 (a) 6 sec (b) 9 sec
 (c) 18 sec (d) 27 sec
157. A train 100 m long is running at the speed of 30 km/hr. The time (in second) in which it will pass a man standing near the railway line is :
 (a) 10 sec (b) 11 sec
 (c) 12 sec (d) 15 sec
158. How many seconds will a 500 metre long train take to cross a man walking with a speed of 3 km/hr in the direction of the moving train if the speed of the train is 63 km/hr?
 (a) 25 sec (b) 30 sec
 (c) 40 sec (d) 45 sec



159. The length of a train and that of a platform are equal. If with a speed of 90 km/hr the train crosses the platform in one minute, then the length of the train (in metres) is :
- (a) 500 (b) 600
(c) 750 (d) 900
160. A train passes a 50 metre long platform in 14 seconds and a man standing on the platform in 10 seconds. The speed of the train is :
- (a) 2 km/hr (b) 36 km/hr
(c) 40 km/hr (d) 45 km/hr
161. A train is 125 m long. If the train takes 30 seconds to cross a tree by the railway line, then the speed of the train is :
- (a) 14 km/hr (b) 15 km/hr
(c) 16 km/hr (d) 12 km/hr
162. A train passes two bridges of length 800 m and 400 m in 100 seconds and 60 seconds respectively. The length of the train is :
- (a) 80 m (b) 90 m
(c) 200 m (d) 150 m
163. A train passes a man standing on a platform in 8 seconds and also crosses the platform which is 264 metre long in 20 seconds. The length of the train (in metres) is :
- (a) 188 (b) 176
(c) 175 (d) 96
164. A 75 metre long train is moving at 20 kmph. It will cross a man standing on the platform in:
- (a) 12 seconds
(b) 14 seconds
(c) 13.5 seconds
(d) 15.5 seconds
165. A 150 metre long train crosses a 500 metre long bridge in 30 seconds. What time will it take to cross a platform 370 metre long?
- (a) 36 seconds
(b) 30 seconds
(c) 24 seconds
(d) 18 seconds
166. A train 300 metre long is running at a speed of 25 metre per second. It will cross a bridge of 200 metre in :
- (a) 5 seconds
(b) 10 seconds
(c) 20 seconds
(d) 25 seconds
167. A train 800 metre long is running at the speed of 78 km/hr. If it crosses a tunnel in 1 minute, then the length of the tunnel (in metres) is :
- (a) 720 (b) 500
(c) 1300 (d) 13
168. Two trains are running in opposite directions with the same speed. If the length of each train is 120 metre and they cross each other in 12 second then find the speed of each train (in km/hour) :
- (a) 72 (b) 10
(c) 36 (d) 18
169. A person standing on a railway platform noticed that a train took 21 seconds to completely pass the platform which was 84 m long and it took 9 seconds to pass him. The speed of the train was :
- (a) 25.2 km/hour
(b) 32.4 km/hour
(c) 50.4 km/hour
(d) 75.6 km/hour
170. Two trains are running with speeds 30 km/hr and 58 km/hr in the same direction. A man in the slower train is passed by the faster train in 18 seconds. The length (in metres) of the faster train is :
- (a) 70 m (b) 100 m
(c) 128 m (d) 140 m
171. A train takes 18 seconds to pass a platform 162 m long and 15 seconds to pass another platform 120 m long. The length of the train (in m) is :
- (a) 70 (b) 80
(c) 90 (d) 105
172. Two trains are moving on two parallel tracks but in opposite directions. A person sitting in the train moving at the speed of 80 km/hr passes the second train in 18 seconds. If the length of the second train is 1000 m, its speed is :
- (a) 100 km/hr
(b) 120 km/hr
(c) 140 km/hr
(d) 150 km/hr
173. The ratio of lengths of two trains is 5 : 3 and the ratio of their speeds is 6 : 5. The ratio of time taken by them to cross a pole is :
- (a) 5 : 6 (b) 11 : 8
(c) 25 : 18 (d) 27 : 16
174. Two trains travel in the same direction at the speeds of 56 km/h and 29 km/h respectively. The faster train passes a man in the slower train in 10 seconds. The length of the faster train (in metres) is :
- (a) 100 (b) 80
(c) 75 (d) 120
175. A train passes a platform 90 metre long in 30 seconds and a man standing on the platform in 15 seconds. The speed of the train is :
- (a) 12.4 kmph (b) 14.6 kmph
(c) 18.4 kmph (d) 21.6 kmph
176. A moving train crosses a man standing on a platform and a bridge 300 metre long in 10 seconds and 25 seconds respectively. What will be the time taken by the train to cross a platform 200 metre long?
- (a) $16\frac{2}{3}$ seconds
(b) 18 seconds
(c) 20 seconds
(d) 22 seconds
177. A train travelling at 48 km/hr passes another train, which is half its length and travelling in the opposite direction at 42 km/hr, in 12 seconds. It also passes a railway platform in 45 seconds. The length of the railway platform is :
- (a) 200 m (b) 300 m
(c) 350 m (d) 400 m



178. A train with a uniform speed passes a platform 122 metre long in 17 seconds, and a bridge, 210 metre long, in 25 seconds. The speed of the train is :
 (a) 46.5 km/hour
 (b) 37.5 km/hour
 (c) 37.6 km/hour
 (d) 39.6 km/hour
179. A passenger train 150 m long is travelling at a speed of 36 km/hr. If a man is cycling in the direction of the train at 9 km/hr., the time taken by the train to pass the man is :
 (a) 10 sec (b) 15 sec
 (c) 18 sec (d) 20 sec
180. A train 300 m long passed a man walking along the line in the same direction at the rate of 3 km/hr in 33 seconds. The speed of the train is :
 (a) 30 km/h
 (b) 32 km/h
 (c) $32\frac{8}{11}$ km/h
 (d) $35\frac{8}{11}$ km/h
181. Two trains, 80 metre and 120 metre long, are running at the speed of 35 km/hr and 25 km/hr respectively in the same direction on parallel tracks. How many seconds will they take to pass each other ?
 (a) 48 sec (b) 64 sec
 (c) 70 sec (d) 72 sec
182. A train crosses a pole in 15 seconds and a 100 metre long platform in 25 seconds. The length of the train is :
 (a) 125 m (b) 130 m
 (c) 150 m (d) 175 m
183. A train travelling with uniform speed crosses two bridges of lengths 300 m and 240 m in 21 seconds and 18 seconds respectively. The speed of the train is :
 (a) 72 km/hr (b) 40.5 km/hr
 (c) 41 km/hr (d) 42 km/hr
184. A train, 110 m long, is running at a speed of 60 km/hr. How many seconds does it take to cross another train, 170 m long, standing on parallel tracks ?
 (a) 15.6 (b) 16.8
 (c) 17.2 (d) 18
185. Two trains of equal length are running on parallel lines in the same direction at 46 km/h and 36 km/h. The faster train passes, the slower train in 36 seconds. The length of each train is :
 (a) 82 m (b) 50 m
 (c) 80 m (d) 72 m
186. A man standing on a platform finds that a train takes 3 seconds to pass him and another train of the same length moving in the opposite direction, takes 4 seconds. The time taken by the trains to pass each other will be :
 (a) $2\frac{3}{7}$ seconds (b) $3\frac{3}{7}$ seconds
 (c) $4\frac{3}{7}$ seconds (d) $5\frac{3}{7}$ seconds
187. A train passes two persons walking in the same direction at a speed of 3 km/hour and 5 km/hour respectively in 10 seconds and 11 seconds respectively. The speed of the train is :
 (a) 28 km/hour
 (b) 27 km/hour
 (c) 25 km/hour
 (d) 24 km/hour
188. A train overtakes two girls who are walking in the opposite direction in which the train is going at the rate of 3 km/h and 6 km/h and passes them completely in 36 seconds and 30 seconds respectively. The length of the train (in metres) is :
 (a) 120 m (b) 150 m
 (c) 125 m (d) none of these
189. A train moves from a station and after travelling 100 km meets with an accident. And then the speed of the train reduces by $\frac{1}{4}$ th of its former speed. And travelling the remaining distance it reaches to its destination $1\frac{7}{8}$ hours late. If the accident occurred 60 km ahead then it reaches 15 min earlier. Then find its original speed and the distance of its journey ?
 (a) 80 km/h, 550 km
 (b) 100 km/h, 540 km
 (c) 60 km/h, 360 km
 (d) 90 km/h, 500 km
190. A train covers a distance of 10 km in 12 minutes. If its speed is decreased by 5 km/hour, the time taken by it to cover the same distance will be :
 (a) 10 minutes
 (b) 13 minutes 20 sec
 (c) 13 minutes
 (d) 11 minutes 20 sec
- Directions for question number 191- 193 :** Rakesh Yadav goes at a speed of 60 km/h. Pawan goes at a speed of 36 km/h. Bhuvnesh can go from A to B in 2 hours. The distance between A to B is equal to the distance between A to C. pawan takes the same time travelling from B to A as from B to C at his regular speed which is twice the speed of Bhuvnesh.
191. What is the speed of Bhuvnesh ?
 (a) 60 km/hr (b) 27 km/hr
 (c) 36 km/hr (d) 18 km/hr
192. How much time will Rakesh yadav takes to complete a round trip of the three cities ?
 (a) 1 h 12 min
 (b) 1 h 48 min
 (c) 1 h 30 min
 (d) 1 h 36 min
193. If Rakesh yadav and Bhuvnesh travel towards each other from B and C respectively, how far from B will they meet each other?
 (a) $\frac{60}{13}$ km (b) $27\frac{9}{13}$ km
 (c) $37\frac{9}{13}$ km (d) $\frac{360}{9}$ km

**Directions for question number**

194 and 195 : Two Trains A_1 and B_1 start simultaneously from Lucknow and Jamshedpur towards each other and continuously shuttle between these two places. Every time these trains meet each other, they turn back after exchanging their respective speeds, the initial ratio of their speeds is 2 : 1.

194. What is the number of distinct places at which they will meet ?

- (a) 1 (b) 2
(c) 5 (d) none of these

195. Let these two trains first time meet at Patna, then what is the ratio of distances covered by trains A_1 and B_1 till they meet for the third time at the same place, Patna:

- (a) 1 : 1
(b) 14 : 13
(c) 10 : 11
(d) none of these

196. Two motorists met at 10 a.m. at the Dadar railway station. After their meeting, one of them proceeded in the East direction while the other proceeded in North direction. Exactly at noon, they were 60 km apart. Find the speed of the slower motorist if the difference of their speeds is 6 km/h :

- (a) 28 km/h (b) 18 km/h
(c) 9 km/h (d) 19 km/h

197. Two trains start from a certain place on two parallel tracks in the same direction. The speed of the trains are 45 km/hr and 40 km/hr respectively. The distance between the two trains after 45 minutes will be:

- (a) 2 km 500 m
(b) 2 km 750 m
(c) 3 km 750 m
(d) 3 km 250 m

198. The distance between two cities A and B is 330 km. A train starts from A at 8 a.m. and travels towards B at 60 km/hr. Another train starts from B at 9 a.m. and travels towards A at 75 km/hr. At what time do they meet ?

- (a) 10 a.m. (b) 10 : 30 a.m.
(c) 11 a.m. (d) 11 : 30 a.m.

199. Two trains start from stations A and B and travel towards each other at speeds of 50 km/hour and 60 km/hour respectively. At the time of their meeting, the second train has travelled 120 km more than the first. The distance between A and B is :

- (a) 990 km (b) 1200 km
(c) 1320 km (d) 1440 km

200. Two stations X and Y are 220 km apart. Trains P and Q start at 8 am and 9:51 am respectively from station X moves towards Y at the speed of 25 km/h and 20 km/h respectively, and another train R starts at 11 : 30 am from station Y moves towards X at the speed by 30 km/h. Then find out when and where will the train P has equal distance from the trains Q and R?

- (a) 120 km, 12 : 48 pm
(b) 180 km, 12 : 51 pm
(c) 160 km, 4 : 10 pm
(d) 150 km, 3 : 50 pm

201. At what distance from Delhi will a train, which leaves Delhi for Amritsar at 2.45 pm and goes at the rate of 50 km an hour, meets a train which leaves Amritsar for Delhi at 1.35 pm and goes at the rate of 60 km per hour, the distance between the two towns being 510 km?

- (a) 150 km (b) 170 km
(c) 200 km (d) 210 km

202. The distance between two stations A and B is 900 km. A train P starts from A and moves towards B at an average speed of 30 km/hr. Another train Q starts from B, 20 minutes earlier than the train P, and moves towards A at an average speed of 40 km/hr. How far from A will the two trains meet?:

- (a) 380 km (b) 320 km
(c) 240 km (d) None of these

203. Two stations A and B are 110 km apart on a straight line. A train P starts from A and travels towards B at 40 km/hr. Another train Q, starting from B, 2 hrs earlier than P, travels towards A at 50 km/hr. Find the distance from station A at which two trains meet ?

- (a) 5 km (b) $5\frac{4}{9}$ km
(c) 4 km (d) $4\frac{4}{9}$ km

204. A train P which travels at the uniform rate of 10 metre per second leaves Patna for Kanpur at 7 am. At what distance from Patna will it meet a train Q which leaves Kanpur for Patna at 7.20 am and travels at one-third of the speed than it does, the distance from Patna to Kanpur being 68 km?

- (a) 28 km (b) 42 km
(c) 36 km (d) 40 km

205. A train P going 50 km an hour leaves Calcutta for Allahabad (900 km) at 9 pm. Another train Q going 70 km an hour leaves Allahabad for Calcutta at the same time, when and where will they pass each other ?

- (a) 375 km from Calcutta, 4.30 am
(b) 525 km from Calcutta, 4.30 pm
(c) 525 km from Allahabad, 4.20 am
(d) None of these

206. A starts from Allahabad to Kanpur and walks at the rate of 12 km an hour. B starts from Kanpur 2 hours later and walks towards Allahabad at the rate of 8 kilometres an hour, if they meet in 9 hours after B started, find the distance from Allahabad to Kanpur :

- (a) 204 km (b) 104 km
(c) 140 km (d) 240 km

207. The distance between Delhi and Patna is 1000 km. A train P leaves Delhi for Patna at 5 pm at 150 km/hr. Another train Q leaves Patna for Delhi at 6.30 pm at 100 km/hr. How far from Delhi will the two trains meet?

- (a) 690 km (b) 310 km
(c) 590 km (d) 465 km



208. The distance between two stations A and B is 220 km. A train P leaves A towards B at an average speed of 80 km per hr. After half an hour, another train Q leaves B towards A at an average speed of 100 km/hr. Find the distance from A of the point where the two trains meet:
 (a) 180 km (b) 120 km
 (c) 160 km (d) 80 km
209. A train Aligarh express leaves Delhi for Aligarh at 14 : 30 pm and goes at the rate of 60 km an hour and another train, Rajdhani express leaves Delhi for Aligarh at 16 : 30 pm and goes at the rate of 80 km/h. How far from Delhi will two trains meet if they are moving in the same direction?
 (a) 120 km (b) 360 km
 (c) 480 km (d) 500 km
210. Two trains starting at the same time from two stations 650 km apart and going in opposite direction they meet each other after 10 hours. If one starts 4 hour 20 min late from another train then they meet after 8 hours from the starting of another train. Then find the average speed of the trains?
 (a) 30 km/h, 35 km/h
 (b) 45 km/h, 20 km/h
 (c) 32 km/h, 33 km/h
 (d) 25 km/h, 40 km/h
211. A man is walking at a speed of 6 km/hr by the side of a rail track. A 450m long train moving in the same direction crosses him in 45 seconds, and reaches next station after 1 hour of crossing. Then find after how much time the man will reach at the same station?
 (a) 7 hours (b) 9 hours
 (c) 14 hours (d) 21 hours
212. Two stations P and Q are 288 km apart. Two trains start at the same time and move towards each other. They meet each other after 8 hours. If the train which is moving from station P has the speed of 11 km/hr more than the train which is moving from Q. Then find out the speed of both the trains?
 (a) 23.5 km/h, 12.5 km/h
 (b) 25.5 km/h, 10 km/h
 (c) 30 km/h, 6 km/h
 (d) none of these
213. A train is moving at a speed of 45 km/hr. Inside a tunnel it crosses another train which is one-third of its length and approaching at a speed of 36 km/h in $35\frac{5}{9}$ seconds. The first train crosses the tunnel in $5\frac{1}{3}$ minutes. Then find the length of both the trains and tunnel?
 (a) 600m, 200m, 3400m
 (b) 400m, 400m, 3400m
 (c) 800m, 1000m, 3400m
 (d) 750m, 1000m, 3400m
214. Two trains starting at the same time from two stations A and B 680 km apart and going in opposite direction they meet each other after 8 hours. If one starts from A and the other starts from B after $5\frac{19}{20}$ hours later than A then they meet after $5\frac{1}{5}$ hours. Then find the speeds of the trains?
 (a) 40 km/h, 45 km/h
 (b) 30 km/h, 25 km/h
 (c) 50 km/h, 35 km/h
 (d) 60 km/h, 25 km/h
215. Two stations A and B are 650 km apart. A cyclist moves towards A to B travels 11 km in first hour, 15 km in second hour, 19 km in third hour and 23 km in fourth hour and moves ahead in the same way. At the same time another cyclist moves from B to A travels 63 km in first hour, 57 km in second hour, 51 km in third hour and 45 km in fourth hour and continues in the same manner. After starting of both, how many hours after will they meet?
 (a) 10 hours (b) 6 hours
 (c) 9 hours (d) 3 hours
216. Two stations A and B are 400 km apart. Two trains M and N start at 10 am and 11 : 30 am towards B at the speed of 50 km/h and 40 km/h respectively. Another train P starts at 1 pm from B to A at the speed of 60 km/h. When and where will the train M have the equal distance from train P and train N:
 (a) 80 min, $216\frac{2}{3}$ km
 (b) 78 min, 216 km
 (c) 80 min, 160 km
 (d) none of these
217. Of the two trains the length of one is 120 m more than the other. When they travel in opposite direction they cross each other in 20 seconds. When they travel in same direction then the faster train crosses the slower train in 2 minutes, and the speed of slower train is 45 km/h then find the length of both the trains and also find the speed of the faster train ?
 (a) 240 m, 360 m, 63 km/h
 (b) 220 m, 340 m, 63 km/h
 (c) 320 m, 440 m, 63 km/h
 (d) 800 m, 920 m, 63 km/h
218. Two people A and B start from P and Q (distance = D) at the same time towards each other. They meet at a point R, which is at a distance 0.4D from P. They continue to move to and fro between the two points. Find the distance from point P at which the fourth meeting takes place:
 (a) 0.8 D (b) 0.6 D
 (c) 0.3 D (d) 0.4 D



219. Two trains start from the same point simultaneously and in the same direction. The first train travels at 40 km/h, and the speed of the second train is 25 per cent more than the speed of the first train. Thirty minutes later, a third train starts from the same point and in the same direction. It overtakes the second train 90 minutes later than it overtook the first train. What is the speed of the third train ?
- (a) 20 km/h (b) 60 km/h
(c) 40 km/h (d) 80 km/h
220. A and B are two friends. A lives at a place P and B lives at another place Q. Everyday A goes to Q to meet B at 120 km/h. Thus, he takes 3 hours. On a particular day B started to meet A so he moved towards P. On that day A took only 2 hours to meet B on the way instead of Q.
- (i) What is the ratio of the speeds of A and B?
(ii) What is the speed of B?
- (a) 2 : 1, 60 km/h
(b) 3 : 1, 40 km/hr
(c) 4 : 1, 30 km/hr
(d) None of these
221. Two horses start trotting towards each other, one from A to B and another from B to A. They cross each other after one hour and the first horse reaches B, $\frac{5}{6}$ hours before the second horse reaches A. If the distance between A and B is 50 km. What is the speed of the slower horse?
- (a) 30 km/h (b) 15 km/h
(c) 25 km/h (d) 20 km/h
222. Rakesh Yadav and Bhuvnesh leave towns Kolkata and Ambala at 6 am and travel towards Ambala and Kolkata respectively. Speed of Rakesh Yadav is 60 km/h and speed of Bhuvnesh is 120 km/h. Pawan leaves Kolkata for Ambala sometime later and travels at a speed of 90 km/h. If the distance between Kolkata and Ambala is 1080 km and all three meet at the same point on the way, at same time, then at what time did pawan leave Kolkata?
- (a) 7 am (b) 8 am
(c) 7 : 30 am (d) 10 am
223. Rakesh yadav and Bhuvnesh started from two places A and B towards B and A respectively at 8 : 20 am. The speeds of Rakesh yadav and Bhuvnesh are in the ratio 4 : 5. They meet at C, somewhere between A and B, spent some-time together enjoyed tea and Samosa and then both started towards their destination at 9 : 27 am. If Rakesh yadav reaches B at 10 : 32 am, how much time did they spend together?
- (a) 8 min (b) 12 min
(c) 15 min (d) can't be determined
224. A train with 120 wagons crosses Rakesh Yadav who is going in the same direction, in 36 seconds. It travels for half an hour from the time it starts overtaking Rakesh Yadav (he is riding on a horse) before it starts overtaking Bhuvnesh (who is also riding on his horse) coming from the opposite direction in 24 seconds. How much time (in seconds) after the train has crossed Bhuvnesh, do Rakesh Yadav meet Bhuvnesh?
- (a) 3560 sec (b) 3600 sec
(c) 3576 sec (d) can't be determined
225. Rakesh Yadav and Bhuvnesh start from A and B towards B and A respectively, at the same time. After they meet at C on the way from A to B, Rakesh Yadav reduces his speed by 33.33% and returns to A and Bhuvnesh increases his speed by 33.33% and returns to B. If Rakesh yadav takes 2 hours for the entire journey, what is the time taken by Bhuvnesh for the entire journey?
- (a) 96 min (b) 84 min
(c) 168 min (d) can't be determined
226. A, B and C started out on a journey to watch the newly released movie "PK", which was being shown at wave cine-multiplex. The multiplex was 120 km away from their starting point of journey. A and C went by car at the speed of 50 km/h, while B travelled by Tonga (horse cart) at 10 km/h. After a certain distance C got off and travelled the rest distance by another Tonga at 10 km/h, while A went back to pick up B and reached the destination at the same time that C arrived. The number of hours required for the trip was:
- (a) 4 h (b) 5 h
(c) 4.8 h (d) Can't be determined
227. A thief sees a jeep at a distance of 250 m, coming towards him at 36 km/h. Thief takes 5 seconds to realise that there is nothing but the police is approaching him by the jeep and start running away from police at 54 km/h. But police realise after 10 seconds, when the thief starts running away, that he is actually a thief and gives chase at 72 km/h. How long after thief saw police did police catchup with him and what is the distance police had to travel to do so?
- (a) 50 sec, 1000 m
(b) 65 sec, 1150 m
(c) 65 sec, 1300 m
(d) 45 sec, 1050 m
228. A certain distance is covered by a vehicle at a certain speed. If half of this distance is covered by another vehicle in double the time, the ratio of the speeds of the two vehicles is :
- (a) 1 : 4 (b) 1 : 2
(c) 2 : 1 (d) 4 : 1



229. A man travelled a distance of 61 km in 9 hours partly on foot at the rate of 4 km/hr and partly on bicycle at the rate of 9 km/hr. The distance travelled on foot was :
- (a) 12 km (b) 16 km
(c) 20 km (d) 24 km
230. Two trains, A and B, start from stations X and Y towards Y and X respectively. After passing each other, they take 4 hours 48 minutes and 3 hours 20 minutes to reach Y and X respectively. If train A is moving at 45 km/hr., then the speed of the train B is:
- (a) 60 km/hr (b) 64.8 km/hr
(c) 54 km/hr (d) 37.5 km/hr
231. Two trains A and B move towards each other at the same time from different stations P and Q respectively. After meeting each other, the train A takes 2 hour 24 minutes to reach Q and the train B takes 4 hours 16 min. to reach the station P. If the speed of the train B is 60 km/h then find the speed of the train A ?
- (a) 80 km/h (b) 60 km/h
(c) 70 km/h (d) 90 km/h
232. A train moves from a station and after travelling 90 km it meets with an accident. Due to this its speed reduces by $\frac{2}{3}$ rd of its former speed and reaches to its destination 2 hours 20 min late. If his accident occurs 18 km before then it reaches to destination 2 hours 32 min late. Find the initial speed of the train and the distance between the station and its destination?
- (a) 45 km/h, 300 km
(b) 50 km/h, 300 km
(c) 45 km/h, 360 km
(d) none of these
233. If a train runs at 40 km/hour, it reaches its destination late by 11 minutes. But if it runs at 50 km/hour, it is late by 5 minutes only. The correct time (in minutes) for the train to complete the journey is :
- (a) 13 (b) 15
(c) 19 (d) 21
234. A train approaches a tunnel AB, Inside the tunnel a cat located at a point i.e., $\frac{5}{12}$ of the distance AB measured from the entrance A. When the train whistles, the cat runs. If the cat moves to the entrance of the tunnel A, the train catches the cat exactly at the entrance. If the cat moves to the exit B, the train catches the cat exactly at the exit. The speed of the train is greater than the speed of the cat by what order?
- (a) 6 : 1 (b) 7 : 3
(c) 5 : 2 (d) 12 : 5
235. Two trains running at 4 km/h and 3 km/h from A to B of 24.5 km distance, faster train reach at B and return back and meets with the slower train. Find how far they meet from A ?
- (a) 21.5 km (b) 22 km
(c) 20 km (d) 21 km
236. Train X starts from point A for point B at the same time another train Y starts from B to A. point A and B are 300 km apart. The trains are moving at a constant speed atleast at 25 km/h. The trains meet each other 3 hours after they start. If the faster train takes atleast 2 more hours to reach the destination. By which time will the slower train have definitely reached its destination ? (Ignoring the length of trains in crossing)
- (a) 4 hours after the start
(b) 7.5 hours after the start
(c) 6 hours after the start
(d) none of these
237. Speed of a faster train is 100 km/hr and it takes 3 minutes rest after covering each 75 km distance while the slower train is running at the speed of 50 km/hr and it takes 1 minute rest after covering each 25 km distance. Find the distance travelled by the slower train when the faster train travels 600 km distance ?
- (a) 520 km (b) 307.5 km
(c) 460 km (d) 325 km
238. A steam engine can travel 24 km/h without the train wagons. The reduction in speed of engine is directly proportional to the square root of the number of wagons. With 4 wagons the speed of engine is 20 km/h. Find the number of maximum wagons which can be pulled by the engine?
- (a) 143 (b) 144
(c) 142 (d) 145
239. The speed of a train in travelling a certain distance is inversely proportional to the square root of time taken by the train. The train takes 4 hours to the same distance at a speed of 40 km/h. If it travels 60 km/h, then find the time taken by train to travel the same distance ?
- (a) $1\frac{7}{9}$ hours (b) $2\frac{7}{9}$ hours
(c) $5\frac{7}{9}$ hours (d) none of these
240. An electric engine can travel 36 km/h without the train wagons. The reduction in speed of engine is directly proportional to the square root of the number of the train wagons. With 9 wagons the speed of the engine is 30 km/h. Find the number of maximum wagons which can be pulled by the engine:
- (a) 324 (b) 322
(c) 323 (d) none of these
241. A man travelled a certain distance by train at the rate of 25 km/h and walked back at the rate of 4 km/h. If the whole journey took 5 hours 48 minutes, the distance was
- (a) 25 km (b) 30 km
(c) 20 km (d) 15 km



242. A train covers a distance of 10 km in 12 minutes. If its speed is decreased by 5 km/hr, the time taken by it to cover the same distance will be:
 (a) 10 minutes
 (b) 13 minutes 20 sec
 (c) 13 minutes
 (d) 11 minutes 20 sec
243. A bullock cart has to cover a distance of 120 km in 15 hours. If it covers half of the journey in $\frac{3}{5}$ th time, the speed to cover the remaining distance in the time left has to be
 (a) 6.4 km/hr
 (b) 6.67 km/hr
 (c) 10 km/hr
 (d) 15 km/hr
244. A man rides at the rate of 18 km/hr, but stops for 6 mins to change horse at the end of every 7th km. The time that he will take to cover a distance of 90 km is
 (a) 6 hrs.
 (b) 6 hrs. 12 min.
 (c) 6 hrs. 18 min.
 (d) 6 hrs. 24 min.
245. You arrive at your school 5 minutes late if you walk with a speed of 4 km/h, but you arrive 10 minutes before the scheduled time if you walk with a speed of 5 km/h. The distance of your school from house (in km) is
 (a) 4 (b) 5
 (c) 10 (d) 2
246. A car driver leaves Bangalore at 8.30 a.m. and expects to reach at place 300 km from Bangalore at 12.30 p.m. At 10.30 he finds that he has covered only 40% of the distance. By how much he has to increase the speed of the car in order to keep up his schedule?
 (a) 45 km/hr.
 (b) 40 km/hr.
 (c) 35 km/hr.
 (d) 30 km/hr.
247. A student goes to school at the rate of $\frac{5}{2}$ km/hr and reaches 6 minutes late. If he travels at the speed of 3 km/hr he reaches 10 minutes earlier. The distance of the school is
 (a) 45 km (b) 20 km
 (c) 10 km (d) 4 km
248. The distance between 2 places R and S is 42 km. Anita starts from R with a uniform speed of 4 km/hr towards S and at the same time Romita starts from S towards R also with some uniform speed. They meet each other after 6 hours. The speed of Romita is
 (a) 3 km/hr (b) 6 km/hr
 (c) 20 km/hr (d) 8 km/hr
249. A farmer travelled a distance of 61 km in 9 hours. He travelled partly on foot at the rate 4 kmph and partly on bicycle at the rate 9 kmph. The distance travelled on foot is
 (a) 16 km (b) 14 km
 (c) 17 km (d) 15 km
250. A student starting from his house walks at a speed of $2\frac{1}{2}$ km/hour and reaches his school 6 minutes late. Next day starting at the same time he increases his speed by 1 km/hour and reaches 6 minutes early. The distance between the school and his house is
 (a) 4 km (b) $3\frac{1}{2}$ km
 (c) $1\frac{3}{4}$ km (d) 4 km
251. A train travelling with uniform speed crosses two bridges of lengths 300 m and 240 m in 21 seconds and 18 seconds respectively. The speed of the train is:
 (a) 72 km/hr (b) 68 km/hr
 (c) 65 km/hr (d) 60 km/hr
252. A passenger train 150 m long is travelling with a speed of 36 km/hr. If a man is cycling in the direction of train at 9 km/hr the time taken by the train to pass the man is
 (a) 10 sec (b) 15 sec
 (c) 18 sec (d) 20 sec
253. A train 150 m long passes a stone in 30 seconds and another train of the same length traveling in opposite direction in 10 seconds. The speed to the second train is:
 (a) 90 km/hr (b) 125 km/hr
 (c) 25 km/hr (d) 75 km/hr
254. The distance between two cities A and B is 330 km. A train Starts From A at 8 a.m. and travels towards B at 60 km/hr. Another train starts from B at 9 a.m. and travels towards A at 75 km/hr. At what time do they meet?
 (a) 10 a.m. (b) 10:30 a.m.
 (c) 11 a.m. (d) 11:30 a.m.
255. Two trains start from stations A and B and travel towards each other at speed of 50 km/hour and 60 km/hour respectively. At the time of their meeting, the second train has travelled 120 km more than the first. The distance between A and B is:
 (a) 990 km (b) 1200 km
 (c) 1320 km (d) 1440 km
256. Two trains are moving on two parallel tracks but in opposite directions. A person sitting in the train moving at the speed of 80 km/hr passes the second train in 18 seconds. If the length of the second train is 1000 m, its speed is
 (a) 100 km/hr
 (b) 120 km/hr
 (c) 140 km/hr
 (d) 150 km/hr
257. A train, 150 m long, passes a pole in 15 seconds and another train of the same length travelling in the opposite direction in 12 seconds. The speed of the second train is
 (a) 45 km/hr (b) 48 km/hr
 (c) 52 km/hr (d) 54 km/hr



258. Two trains start from station A and B and travel towards each other at speed of 16 miles/hour and 21 miles/hour respectively. At the time of their meeting, the second train has travelled 60 miles more than the first. The distance between A and B (in miles) is:
 (a) 444 (b) 496
 (c) 333 (d) 540
259. Two trains X and Y start from Jodhpur to Jaipur and from Jaipur to Jodhpur respectively. After passing each other they take 4 hours 48 minutes and 3 hours 20 minutes to reach Jaipur and Jodhpur respectively. If X is moving at 45 km/hr, the speed of Y is
 (a) 60 km/hr (b) 58 km/hr
 (c) 54 km/hr (d) 64.8 km/hr
260. Walking at three-fourth of his usual speed, a man covers a certain distance in 2 hours more than the time he takes to cover the distance at his usual speed. The time taken by him to cover the distance with his usual speed is
 (a) 4.5 hours (b) 5.5 hours
 (c) 6 hours (d) 5 hours
261. Walking at $\frac{3}{4}$ of his usual speed, a man is $1\frac{1}{2}$ hours late. His usual time to cover the same distance, (in hours) is
 (a) $4\frac{1}{2}$ (b) 4
 (c) $5\frac{1}{2}$ (d) 5
262. A car travels from P to Q at a constant speed. If its speed were increased by 10 km/h, it would have been taken one hour lesser to cover the distance. It would have taken further 45 minutes lesser if the speed was further increased by 10 km/h. The distance between the two cities is
 (a) 640 km (b) 420 km
 (c) 600 km (d) 620 km
263. A person went from A to B at an average speed of x km/hr and returned from B to A at an average speed of y km/hr. What was his average speed during the total journey?
 (a) $\frac{x+y}{2xy}$ (b) $\frac{2xy}{x+y}$
 (c) $\frac{2}{x+y}$ (d) $\frac{1}{x} + \frac{1}{y}$
264. A man walks from his house at an average speed of 5 km per hour and reaches his office 6 minutes late. If he walks at an average speed of 6 km/h he reaches 2 minutes early. The distance of the office from his house is
 (a) 6 km (b) 9 km
 (c) 12 km (d) 4 km
265. A train travels 500 m in first minute. In the next 4 minutes, it travels 125 m more than that in the previous minute. The average speed per hour of the train during those 5 minutes will be
 (a) 30 km/hr (b) 45 km/hr
 (c) 50 km/hr (d) 55 km/hr
266. Three cars travelled distance in the ratio 1 : 2 : 3. If the ratio of the time of travel is 3 : 2 : 1, then the ratio of their speed is
 (a) 1 : 3 : 9 (b) 9 : 1 : 3
 (c) 3 : 1 : 2 (d) 1 : 9 : 3
267. A cyclist, after cycling a distance of 70 km on the second day finds that the ratio of distance covered by him on the first two days is 4 : 5. If he travels a distance of 42 km on the third day, then the ratio of distance travelled on the third day and the first day is:
 (a) 4 : 3 (b) 3 : 2
 (c) 3 : 4 (d) 2 : 3
268. Two trains are running at 40 km/hr and 20 km/hr respectively in the same direction. The faster train completely passes a man sitting in the slower train in 5 seconds. The length of the faster train is
 (a) $23\frac{2}{9}$ m (b) 27 m
 (c) $27\frac{7}{9}$ m (d) 23 m
269. If a man walks 20 km at 5 km/hr, he will be late by 40 minutes. If he walks at 8 km/hr, how early from the fixed time will he reach?
 (a) 15 min (b) 25 min
 (c) 50 min (d) $1\frac{1}{2}$ hours
270. A train covers a distance between station A and station B in 45 minutes. If the speed of the train is reduced by 5 km/hr, then the same distance is covered in 48 minutes the distance between station A and B is
 (a) 60 km (b) 64 km
 (c) 80 km (d) 55 km
271. A train passes a man standing on a platform in 8 seconds and also crosses the platform which is 264 metres long in 20 seconds. The length of the train (in metres) is:
 (a) 188 (b) 176
 (c) 175 (d) 96
272. A person standing on a railway platform noticed that a train took 21 seconds to completely pass through the platform which was 84 m long and it took 9 seconds in passing him. The speed of the train was
 (a) 25.2 km/hr
 (b) 32.4 km/hr
 (c) 50.4 km/hr
 (d) 75.6 km/hr
273. A train passes by a lamp post on a platform in 7 sec and passes by the platform completely in 28 sec. If the length of the platform is 390 m, then length of the train (in metres) is
 (a) 120 (b) 130
 (c) 140 (d) 150



274. A, B and C start at the same time and in the same direction to run around a circular stadium. A completes a round in 252 seconds, B in 308 seconds and C in 198 seconds, all starting at the same point. After what time will they next meet at the starting point again?
- (a) 46 minutes 12 seconds
(b) 45 minutes
(c) 42 minutes 36 seconds
(d) 26 minutes 18 seconds
275. Two guns are fired from the same place at an interval of 6 minutes. A person approaching the place observes that 5 minutes 52 seconds have elapsed between the hearing of the sound of the two guns. If the velocity of the sound is 330 m/sec, then man was approaching that place at what speed (in km/hr)?
- (a) 24 (b) 27
(c) 30 (d) 36
276. In covering a distance of 30 km, Abhay takes 2 hours more than Sameer. If Abhay doubles his speed, then he would take 1 hour less than Sameer. Abhay's speed (in km/hr) is
- (a) 5 (b) 6
(c) 6.25 (d) 7.5
277. From two places, 60 km apart, A and B start towards each other at the same time and meet each other after 6 hours.
- Had A travelled with $\frac{2}{3}$ of his speed and B travelled with double of his speed, they would have met after 5 hours. The speed of A is
- (a) 4 km/hr.
(b) 6 km/hr.
(c) 10 km/hr.
(d) 12 km/hr.
278. Ravi and Ajay start simultaneously from a place A towards B, 60 km apart. Ravi's speed is 4 km/hr less than that of Ajay. Ajay, after reaching B, turns back and meets Ravi at a place 12 km away from B. Ravi's speed is
- (a) 12 km/hr
(b) 10 km/hr
(c) 8 km/hr
(d) 6 km/hr
279. A is twice as fast runner as B, and B is thrice as fast runner as C. If C travelled a distance in 1 hour 54 minutes, the time taken by B to cover the same distance is
- (a) 19 minutes
(b) 38 minutes
(c) 51 minutes
(d) 57 minutes
280. A, B, C walk 1 km in 5 minutes, 8 minutes and 10 minutes respectively. C starts walking from a point, at a certain time, B starts from the same point 1 minute later and A starts from the same point 2 minutes later than c. Then A meets B and C after
- (a) $\frac{5}{3}$ min, 2 min
(b) 1 min, 2 min
(c) 2 min, 3 min
(d) $\frac{4}{3}$ min, 3 min
281. Two cars are moving with speed v_1 , v_2 towards a crossing along two roads. If their distance from the crossing be 40 metres and 50 metres at an instant of time then they do not collide if their speed are such that
- (a) $v_1 : v_2 = 16 : 25$
(b) $v_1 : v_2 \neq 4 : 5$
(c) $v_1 : v_2 \neq 5 : 4$
(d) $v_1 : v_2 = 25 : 16$
282. A plane can cover 6000 km in 8 hours. If the speed is increased by 250 km/hr then the time taken by the plane to cover 9000 km is
- (a) 8 hours (b) 6 hours
(c) 5 hours (d) 9 hours

ANSWER KEY

1. (b)	31. (d)	61. (a)	91. (b)	121.(a)	151.(a)	181.(d)	211.(a)	241.(c)	271.(b)
2. (d)	32. (d)	62. (a)	92. (b)	122.(a)	152.(a)	182.(c)	212.(a)	242.(b)	272.(a)
3. (d)	33. (a)	63. (a)	93. (d)	123.(a)	153.(a)	183.(a)	213.(a)	243.(c)	273.(b)
4. (a)	34. (b)	64. (a)	94. (c)	124.(a)	154.(a)	184.(b)	214.(a)	244.(b)	274.(a)
5. (c)	35. (a)	65. (a)	95. (b)	125.(a)	155.(a)	185.(b)	215.(a)	245.(b)	275.(b)
6. (a)	36. (b)	66. (a)	96. (c)	126.(a)	156.(c)	186.(b)	216.(a)	246.(d)	276.(a)
7. (b)	37. (b)	67. (a)	97. (b)	127.(b)	157.(c)	187.(c)	217.(a)	247.(d)	277.(b)
8. (c)	38. (a)	68. (a)	98. (d)	128.(c)	158.(b)	188.(b)	218.(a)	248.(a)	278.(c)
9. (c)	39. (b)	69. (a)	99. (c)	129.(c)	159.(c)	189.(a)	219.(b)	249.(a)	279.(b)
10. (c)	40. (b)	70. (d)	100.(c)	130.(d)	160.(d)	190.(b)	220.(a)	250.(c)	280.(a)
11. (b)	41. (b)	71. (c)	101.(d)	131.(b)	161.(b)	191.(d)	221.(d)	251.(a)	281.(b)
12. (c)	42. (a)	72. (c)	102.(a)	132.(c)	162.(c)	192.(b)	222.(b)	252.(d)	282.(d)
13. (c)	43. (c)	73. (a)	103.(d)	133.(d)	163.(b)	193.(b)	223.(c)	253.(c)	
14. (b)	44. (b)	74. (a)	104.(c)	134.(c)	164.(c)	194.(d)	224.(c)	254.(c)	
15. (a)	45. (d)	75. (c)	105.(c)	135.(a)	165.(c)	195.(b)	225.(b)	255.(c)	
16. (d)	46. (a)	76. (a)	106.(b)	136.(a)	166.(c)	196.(b)	226.(c)	256.(b)	
17. (a)	47. (a)	77. (b)	107.(a)	137.(d)	167.(b)	197.(c)	227.(b)	257.(d)	
18. (b)	48. (a)	78. (a)	108.(d)	138.(c)	168.(c)	198.(c)	228.(d)	258.(a)	
19. (a)	49. (a)	79. (a)	109.(c)	139.(a)	169.(a)	199.(c)	229.(b)	259.(c)	
20. (c)	50. (a)	80. (a)	110.(a)	140.(a)	170.(d)	200.(a)	230.(c)	260.(c)	
21. (a)	51. (b)	81. (a)	111.(d)	141.(c)	171.(c)	201.(c)	231.(a)	261.(a)	
22. (d)	52. (a)	82. (a)	112.(a)	142.(b)	172.(b)	202.(a)	232.(a)	262.(b)	
23. (a)	53. (d)	83. (c)	113.(c)	143.(a)	173.(c)	203.(d)	233.(c)	263.(b)	
24. (d)	54. (b)	84. (a)	114.(c)	144.(a)	174.(c)	204.(d)	234.(a)	264.(d)	
25. (a)	55. (c)	85. (d)	115.(a)	145.(a)	175.(d)	205.(a)	235.(d)	265.(b)	
26. (b)	56. (b)	86. (b)	116.(a)	146.(d)	176.(c)	206.(a)	236.(b)	266.(a)	
27. (d)	57. (b)	87. (c)	117.(a)	147.(a)	177.(d)	207.(a)	237.(b)	267.(c)	
28. (d)	58. (a)	88. (b)	118.(a)	148.(d)	178.(d)	208.(b)	238.(a)	268.(c)	
29. (c)	59. (c)	89. (c)	119.(a)	149.(d)	179.(d)	209.(a)	239.(a)	269.(c)	
30. (b)	60. (a)	90. (b)	120.(a)	150.(a)	180.(d)	210.(a)	240.(c)	270.(a)	

Solution

1. (b) $\therefore \text{Speed} = \frac{\text{Distance}}{\text{Time}}$

$$= \frac{250}{75} = \frac{10}{3} \text{ m/s}$$

$$= \frac{10}{3} \times \frac{18}{5} = 12 \text{ km/hr.}$$

2. (d) $\therefore \text{Speed} = \frac{\text{Distance}}{\text{Time}}$

$$= \frac{200}{24} = \frac{25}{3} \text{ m/s}$$

$$= \frac{25}{3} \times \frac{18}{5} \text{ km/hr.}$$

$$= 30 \text{ km/hr.}$$

3. (d) Speed of the man = 5 km/hr

$$= \frac{5 \times 1000}{60} \text{ m/min}$$

$$= \frac{250}{3} \text{ m/min}$$

& Time taken to cross the bridge
= 15 minutes

$\therefore$ Length of the bridge
= speed $\times$ time

$$= \frac{250}{3} \times 15 = 1250 \text{ m.}$$

4. (a)

	Initial	Final
Speed $\longrightarrow$	3 (let)	2
Time $\longrightarrow$	2	3
	1 unit more	
	$\left\{ \therefore \text{speed} \propto \frac{1}{\text{time}} \right\}$	

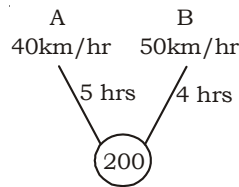
According to the question, it takes 1 hr more.

$$\therefore 1 \text{ unit} \longrightarrow 1 \text{ hour}$$

$$\Rightarrow 2 \text{ units} \longrightarrow 2 \text{ hours}$$

i.e. Initial time taken = 2 hours

5. (c) Let the required distance
= L.C.M. of (40, 50) = 200 km



i.e.

A takes $5 - 4 = 1$ unit more time than B.

But given that A takes 15 min more time than B

$$\therefore 1 \text{ unit} \longrightarrow 15 \text{ min}$$

$$\Rightarrow 1 \text{ unit} \longrightarrow \frac{15}{60} \text{ hr}$$

$$\Rightarrow 200 \text{ units} \longrightarrow \frac{15}{60} \times 200 = 50$$

i.e. Distance = 50 km

6. (a)

	A	B
Speed $\longrightarrow$	3	4
time $\longrightarrow$	4	3
	1 unit more	

But, given that A takes 20 minutes more

i.e.

$$1 \text{ unit} \longrightarrow 20$$

$$\therefore 4 \text{ units} \longrightarrow 20 \times 4 = 80 \text{ min} = \frac{80}{60} \text{ hrs} = 1\frac{1}{3} \text{ hrs}$$

i.e. time taken by A to reach destination = $1\frac{1}{3}$ hrs

7. (b) Let the initial speed of the car be x km/hr and the distance be y km.

$$\therefore y = \frac{9}{2} x \quad \dots (i)$$

$$\text{and } y = 4(x + 5) \quad \dots (ii)$$

$$\therefore \frac{9x}{2} = 4(x + 5)$$

$$\Rightarrow 9x = 8x + 40 \Rightarrow x = 40 \text{ km/hr}$$

Alternatively :

	Initial	Final
Ratio of time $\longrightarrow$	$\frac{9}{2}$	$\frac{9}{2} - \frac{1}{2} = 4$
	= 9	= 8

$$\therefore \text{Ratio of speed} \longrightarrow 8 : 9$$

increased by 1 unit

i.e. 1 unit $\longrightarrow$ 5

$$\therefore 8 \text{ units} \longrightarrow 5 \times 8 = 40 \text{ km/hr}$$

i.e. Initial speed = 40 km/hr

8. (c) Ratio of speeds = 4 : 3

$\therefore$ Ratio of times

$$= 3 : 4$$

1 unit less time

$$\therefore \text{Distance} = 4 \times 3 = 12 \text{ units}$$

But given that former takes half an hour less than the latter.

i.e.

$$1 \text{ unit} \longrightarrow \frac{1}{2}$$

$$\therefore 12 \text{ units} \longrightarrow 12 \times \frac{1}{2} = 6$$

i.e. Required distance = 6 km

9. (c) Let original speed = 11 units

$\therefore$ Final (or New) speed = 7 units

	Original	New
Ratio of speed $\longrightarrow$	11	7

Ratio of time $\longrightarrow$	7	11
	$\left(\times 2 \right)$	$\left(\times 2 \right)$
	14	22

$$\therefore \text{Time saved} = 22 - 14 = 8 \text{ hours}$$

10. (c)

	Initial	Final
Ratio of speeds $\longrightarrow$	5 (let)	3

Ratio of times $\longrightarrow$	3	5
	2 hours late	

$$\text{i.e. } 2 \text{ units} \longrightarrow 2\frac{1}{2} = \frac{5}{2}$$

$$\Rightarrow 3 \text{ units} \longrightarrow$$

$$\frac{5}{2} \times \frac{3}{2} = \frac{15}{4} = 3\frac{3}{4} \text{ hours}$$

i.e. usual time to reach the

$$\text{destination} = 3\frac{3}{4} \text{ hours}$$

11. (b) According to the question,

Initial Speed	:	New speed
7v	:	5v

$$t = 1 \text{ hour } 40 \text{ minutes } 48$$

$$\text{seconds} = \frac{504}{300} \text{ hours}$$

$$\frac{504}{300} = \frac{42}{5v} \rightarrow v = 5 \text{ km/h}$$

$$\text{Initial speed} = 5 \times 7 = 35 \text{ km/h}$$

12. (c)

	A	:	B
Ratio of speeds	→ 6	:	5
Ratio of times	→ 5	:	6

after 1 unit of time

i.e. B reached after 1 unit of time

But, given that, B reach after 1

$$\text{hr } 15 \text{ min} = \frac{5}{4} \text{ hrs}$$

$$\text{i.e. } 1 \text{ unit} \longrightarrow \frac{5}{4}$$

$$\therefore 6 \text{ units} \longrightarrow \frac{5}{4} \times 6 = \frac{15}{2}$$

i.e. B reached the destination in

$$\frac{15}{2} \text{ hours} = 7 \text{ hours } 30 \text{ minutes}$$

13. (c) Distance covered in 10 minutes at 20 km/hr = distance covered in 8 minutes at $(20 + x)$ km/hr

$$\Rightarrow 20 \times \frac{10}{60} = \frac{8}{60} (20 + x)$$

$$\Rightarrow 200 = 160 + 8x$$

$$\Rightarrow x = \frac{40}{8} = 5 \text{ km/hr}$$

14. (b)

	Usual	:	New
Ratio of speeds	→ 4	:	3
Ratio of times	→ 3	:	4

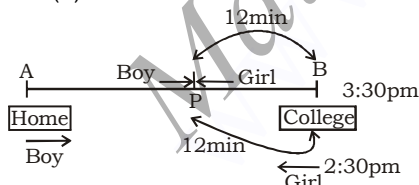
1 unit late

$$\text{i.e. } 1 \text{ unit} \longrightarrow 20$$

$$\Rightarrow 3 \text{ units} \longrightarrow 20 \times 3 = 60$$

i.e., the usual time taken by him to reach his office = 60 minutes.

15. (a)



Let P is a point where the Boy and his Girlfriend meet. They reached home 24 min earlier because his girlfriend left the college 1 hour earlier and meet his boyfriend on the way at P. They saved 24 min because he did not travel the dis-

tance $\overline{PB}$ and $\overline{BP}$.

Time taken by boy in travelling the

$$\text{distance } PB = \frac{24}{2} = 12 \text{ min}$$

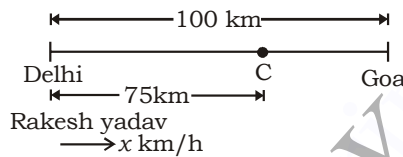
It means boy is at P on 3 : 18 pm

Now we conclude :

Boy	:	Girl
12	:	48 [Time]
4	:	1 [Speed]
↓ × 6		↓ × 6
24 km/h		6 km/h

Speed of the boy = 24 km/h

16. (d)



Let the original speed of Rakesh Yadav be x km/h and scheduled time = t hours.

Let the distance between Delhi and Goa is 100 km.

From question,

Condition (I) :-

He covers 75% of the distance in scheduled time

$$x t = 75 \quad \dots (i)$$

$$\text{and } x(t + 3) = 100 \quad \dots (ii)$$

From (i) & (ii)

$$x = \frac{25}{3} \text{ km/h, } t = 9 \text{ hours}$$

Condition (II):-

Let he doubles his speed after n hours then :

$$n \times \frac{25}{3} + \frac{50}{3} \times (9 - n) = 100$$

$$\frac{25}{3} [n + 18 - 2n] = 100$$

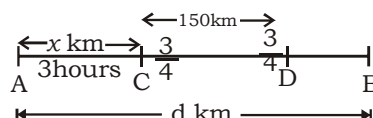
$$18 - n = 12$$

$$n = 6 \text{ hours}$$

So we can say to reach on time he will doubles his speed after 6 hours.

17.

(a) Let the original speed of the train is x km/h and the distance of the journey is d km.



Let C is a point where the train meets with an accident. From this point the train will move 75% of its former speed.

$$75\% = \left(\frac{3}{4} \right) \rightarrow \text{original time}$$

Condition (I) :-

∴ Difference in time

$$= 4 - 3 = 1 \text{ hour}$$

	Speed	:	Time
Original	→ 4	:	3
New	→ 3	:	4

⊖

from question → 3 hours

$$1 \text{ unit} = 3 \text{ hours}$$

$$3 \text{ units} = 3 \times 3 = 9 \text{ hours}$$

Condition (II):-

If accident would occur 150 km ahead then,

$$1 \text{ unit} \rightarrow \frac{5}{2},$$

$$3 \text{ units} \rightarrow \frac{15}{2} \text{ hours}$$

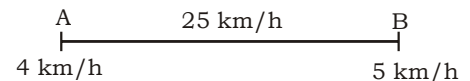
$$\text{Speed} = \frac{d}{t}$$

$$= \frac{150}{\left(9 - \frac{15}{2}\right)} = \frac{150 \times 2}{3} = 100$$

$$\Rightarrow \text{Speed} = 100 \text{ km/h}$$

$$\text{Distance} = 12 \times 100 = 1200 \text{ km}$$

18. (b)



From question condition (i),

Let original speed of the car is 4 km/h

	Speed	:	Time
--	--------------	---	-------------

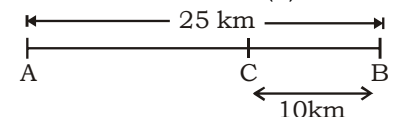
$$\text{Original} \rightarrow 4$$

$$\text{New} \rightarrow 5$$

$$1 \text{ unit} \rightarrow 30 \text{ min}$$

$$5 \text{ units (original time)} = 30 \times 5 = 150 \text{ min}$$

New from condition (ii)



Now the speed would increase when car will reached at point C.

similarly

Speed	:	Time
--------------	---	-------------

Original $\rightarrow 4$ New $\rightarrow 5$

$$\begin{array}{r} 5 \\ 4 \end{array} \textcircled{-1}$$

From question,

$$1 \text{ unit} \rightarrow \frac{162}{5}$$

$$(\text{original time}) 5 \text{ units} \rightarrow \frac{162}{5} \times$$

$$5 = 162 \text{ min}$$

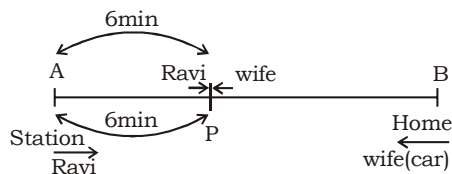
Note : Now try to understand that the difference in time is due to 10km. So we can say the car would travel 10 km in 12 mins.
12 min $\rightarrow$ 10 km

$$1 \text{ min} \rightarrow \frac{10}{12}$$

$$150 \text{ min} \rightarrow \frac{10}{12} \times 150 = 125 \text{ km}$$

$$\text{Total distance} = 125 \text{ km} + 25 \text{ km} = 150 \text{ km}$$

19. (a)



Ravi reached 12 minutes earlier.
Let P is a point where Ravi and his wife meet. Time taken by wife to travel P - A is 6 min.

From question,

Ravi	:	Car
1	:	5
5	:	1
$\times 6$	:	$\times 6$
30min	:	6min

Car takes 6 minutes to travel from A to P and Ravi takes 30 minutes.

$$\text{Effective time} = 30 - 6 = 24 \text{ minutes}$$

Thus, if Ravi had got the car at the station, he would have saved 24 minutes more and reached at 5 : 36

20. (c)



Let A is the place where both the rifles are fired. When first rifle is fired then position of the train is unknown. But when the second rifle is fired then the train is at B. If the train does not move then the man hears the sound after 11 minutes 45 seconds but he hears the sound after 11 minutes, because both the sound and the train are in a moving state.

Now we can say-

The distance travelled by the train in 11 min = distance travelled by sound in 45 seconds.

(Man)Train : Sound

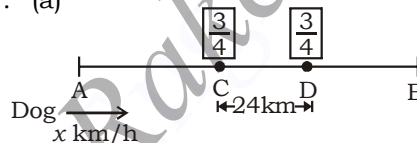
$$\text{Time} \rightarrow 11 \times 60 : 45$$

$$\text{Speed} \rightarrow 3 : 44$$

speed of man(Train)

$$= \frac{330}{44} \times 3 = \frac{90}{4} \times \frac{18}{5} = 81 \text{ km/h}$$

21. (a)



Let the speed of the dog is x km/h, and C is a place where the dog meets to a swami. D is a place where the next meeting occurred.

From question :

Condition (i):-

When meeting held at C.

Time	:	Speed
-------------	---	--------------

$$\text{Actual} \rightarrow 3 : 4$$

$$\text{New} \rightarrow 4 : 3$$

$$\text{Delay} = \text{New time} - \text{Actual time} = 1 \text{ unit}$$

$$\text{From question 1 unit} \rightarrow 35 \text{ minutes}$$

$$\text{actual time} = 35 \times 3 = 105 \text{ minutes}$$

Condition (ii):-

When meeting held at D.

Time	:	Speed
-------------	---	--------------

$$\text{Actual} \rightarrow 3 : 4$$

$$\text{New} \rightarrow 4 : 3$$

According to question $\rightarrow 1 \text{ unit} \rightarrow 25 \text{ minutes}$

Actual time 3 units $\rightarrow 75 \text{ mins}$

Now we conclude the dog would travel 24 km in 30 minutes then:

Speed of the dog

$$= \frac{24}{30} \times 60 = 48 \text{ km/h}$$

Alternate:-

Let,

the speed of the dog before meeting swami = 4x

speed of the dog after meeting swami = 3x

Basically time difference which is 10 minutes is due to 24 kms we can say that,

$$\frac{24}{3x} - \frac{24}{4x} = \frac{10}{60}$$

$$\frac{24}{12x} = \frac{1}{6}$$

$$\frac{2}{x} = \frac{1}{6}, x = 12$$

Speed of dog before meeting swami $\Rightarrow 4x = 48 \text{ km/hr}$.

22. (d) **Case - I:-**

$$\text{Distance} = 240 \times 5 = 1200 \text{ km}$$

Case - II:-

$$\text{Distance} = 1200 \text{ km, time}$$

$$= 1 \frac{2}{3} \text{ hr} = \frac{5}{3} \text{ hr}$$

$$\therefore \text{speed} = \frac{1200}{5/3}$$

$$= 240 \times 3 = 720 \text{ km/hr.}$$

23. (a) Ratio of speed = 40 : 60 = 2 : 3

 $\therefore$ Ratio of times =

$$\begin{array}{cc} 3 & : & 2 \\ \downarrow \times 3 & & \downarrow \times 3 \\ 9 & & 6 \end{array}$$

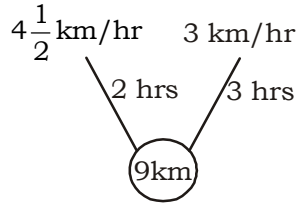
$$\left\{ \because \text{speed} \propto \frac{1}{\text{time}} \right\}$$

i.e., the required time = 6 hours

24. (d) Let the required distance

$$= \text{LCM of } \left(4\frac{1}{2}, 3\right)$$

$$= 9 \text{ km}$$



$\therefore$ total time taken = 2+3
= 5 hrs = the total given time in question

$\therefore$ the required distance = 9 km

25. (a) Initial speed

$$= \frac{20}{2.5} = 8 \text{ km/hr}$$

$\therefore$ New speed = 16 km/hr

& New distance = 32 km

$$\therefore \text{time} = \frac{32}{16} = 2 \text{ hours}$$

26. (b) Let the total distance covered by the car = 2d km

According to the question,

$$\frac{d}{4060} + \frac{d}{120} = 10 \Rightarrow \frac{3d + d}{120} = 10$$

$$5d = 1200 \Rightarrow d = 240 \text{ km}$$

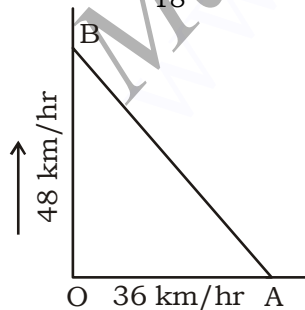
total distance = 2d

$$= 2 \times 240 = 480 \text{ km}$$

27. (d) Let O be the starting point. The car running at 36 km/hr is moving along OA and another car 48 km/hr moving along OB. Also, let they reach at A and B after 15 seconds respectively.

$$\therefore OA = 36 \times \frac{5}{18} \times 15 = 150 \text{ m}$$

$$\& OB = 48 \times \frac{5}{18} \times 15 = 200 \text{ m}$$



$\therefore$ Required distance = AB

$$= \sqrt{(OA)^2 + (OB)^2}$$

$$= \sqrt{(150)^2 + (200)^2}$$

$$= \sqrt{62500} = 250 \text{ m.}$$

28. (d) Ratio of the speed of A, B and C = 6 : 3 : 1

$\therefore$ Ratio of the times taken

$$= \frac{1}{6} : \frac{1}{3} : 1$$

$$\begin{array}{ccc} 1 & : & 2 & : & 6 \\ \downarrow \times 12 & & \downarrow \times 12 & & \\ 12 & & 24 & & 72 \end{array}$$

i.e. Time taken by A = 12 minutes

29. (c) Required ratio

$$= \frac{550}{1} : \frac{33 \times 1000}{45}$$

$$= 550 : \frac{2200}{3} = 1 : \frac{4}{3} = 3 : 4$$

30. (b) Distance covered on foot

$$= 4 \times 3\frac{3}{4} = 15 \text{ km}$$

$\therefore$ Time taken by cycle

$$= \frac{\text{Distance}}{\text{Speed}} = \frac{15}{16.5}$$

$$= \frac{15 \times 60}{16.5} \text{ minutes}$$

$$= 54.55 \text{ minutes}$$

Alternatively:-

Time = 3 hrs 45 min.

= 225 minutes

Ratio of speeds = 4 : 16.5

$$= 4 : \frac{165}{10} = 8 : 33$$

$\therefore$ Ratio of time = 33 : 8

$$\begin{array}{ccc} & \swarrow \times \frac{75}{11} & \searrow \times \frac{75}{11} \\ 225 & & 600 \\ & \swarrow & \searrow \\ & 11 & \end{array}$$

i.e. Required time

$$= \frac{600}{11} \text{ min.}$$

$$= 54.55 \text{ min.}$$

31. (d) Let initial speed = 15 km/hr

$$\left[\therefore \frac{15 \times 1}{15} = 1 \right]$$

$\therefore$ Reduced speed

$$= 15 - 1 = 14 \text{ km/hr}$$

Time = 30 hours in both case.

$\therefore$ Distance (in case I)

$$= 15 \times 30 = 450 \text{ km}$$

& Distance (in case II)

$$= 14 \times 30 = 420 \text{ km}$$

$\therefore$ Difference = 450 - 420

$$= 30 \text{ km}$$

But, the given difference = 10 km

$$\therefore 30 \text{ units} \longrightarrow 10$$

$$\Rightarrow 1 \text{ unit} \longrightarrow \frac{10}{30} = \frac{1}{3}$$

$$\Rightarrow 15 \text{ units} \longrightarrow \frac{1}{3} \times 15 = 5$$

i.e. initial speed = 5 km/hr

32. (d) Let the distance of total journey = LCM of (8, 6) = 24 units

$$\therefore \frac{3}{8} \text{ of the journey} = \frac{3}{8} \times 24$$

$$= 9 \text{ units}$$

$$\text{and } \frac{5}{6} \text{ of the journey} = \frac{5}{6} \times 24 =$$

$$20 \text{ units}$$

i.e. it covered 20 - 9

= 11 units of distance in 4.30 p.m. - 11 a.m.

$$= 5\frac{1}{2} \text{ hours} = \frac{11}{2} \text{ hours}$$

$$\therefore \text{Speed of person} = \frac{11}{11/2} = 2 \text{ km/hr}$$

$\therefore \frac{3}{8}$ of the journey will be covered in

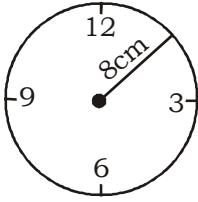
$$= \frac{9}{2} = 4\frac{1}{2} \text{ hours}$$

i.e. The person started at 11 a.m.

$$- 4\frac{1}{2} \text{ hour} = 6.30 \text{ a.m.}$$

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38. (a) Angle made by minute hand in 15 minutes = $15 \times 6 = 90^\circ$

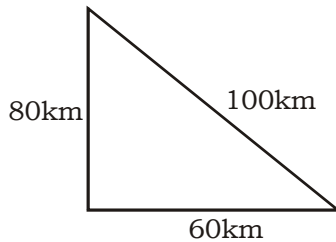


$$\text{Distance travelled} = \frac{2\pi r\theta}{360}$$

$$= \frac{2 \times \pi \times 8 \times 90}{360}$$

$$\text{Distance travelled} = 4\pi$$

39. (b) The following figure gives the movements of the two swimmers.



Note:- On the basis of Pythagoras trip-lets

The faster swimmer must have travelled 80 km in 2 hours and

$$\text{hence speed} = \frac{80}{2}$$

$$S = 40 \text{ km/h}$$

40. (b) The wall clock gains 6 minutes in 36 hours while the table clock loses 2 minutes in 36 hours. Hence, the time difference in 36 hours = 8 minutes. For them to show the same time again, we need a total difference of 12 hours.

8 min difference in 36 hours

$$1 \text{ min} \longrightarrow \frac{36}{8}$$

$$1 \text{ hour} \longrightarrow \frac{36}{8} \times 60$$

$$12 \text{ hours} \longrightarrow \frac{36}{8} \times 60 \times 12 = 3240 \text{ hours}$$

for required no. of days it would be divided by 24 hours per day =

$$\frac{3240}{24} = 135 \text{ days}$$

After 135 days the watch will show the same time at 12 noon.

41. (b) Let the time taken in first third part of the journey be x minutes.

Then according to question.

I II III

$$(x) + \left(\frac{x}{2} + x\right) + \frac{1}{4}\left(x + \frac{x}{2}\right) + \frac{3x}{2}$$

$$= 350 \text{ min.}$$

$$\Rightarrow x + \frac{3x}{2} + \left(\frac{3x}{8} + \frac{3x}{2}\right)$$

$$= 350 \text{ min.}$$

$$\Rightarrow x + \frac{3x}{2} + \frac{15x}{8} = 350$$

$$\Rightarrow \frac{8x + 12x + 15x}{8} = 350$$

$$\Rightarrow \frac{35x}{8} = 350$$

$$x = 80 \text{ minutes}$$

42. (a) **Note:-** Both minute-hand and hour hand move in the same direction then:

Relative speed = Speed of minute hand - Speed of hour hand

Angle rotated by min-hand and

hour-hand in 1 min is 6° and $\frac{1}{2}^\circ$

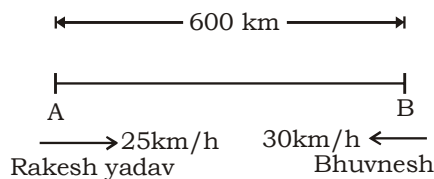
respectively.

Relative Speed

$$= 6^\circ - \frac{1}{2}^\circ = 5\frac{1}{2}^\circ \text{ per minute}$$

Hence option (a) is correct.

43. (c)



According to the question,

time taken by Rakesh Yadav

= 36 hours

Actual time required by Rakesh

$$\text{Yadav} = \frac{600}{25} = 24 \text{ hours.}$$

It means Rakesh Yadav rests for = $(36 - 24) = 12$ hours.

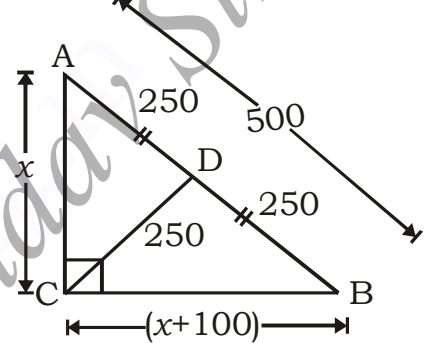
Now the time required for

$$\text{Bhuvnesh} = \frac{600}{30} = 20 \text{ hours.}$$

But Bhuvnesh already walked for 12 hours in which Rakesh Yadav rests, So he needs only $(20 - 12) = 8$ hours extra.

Thus the total time taken by Bhuvnesh = $36 + 8 = 44$ hours

44. (b) According to question,



$AC \perp CB$

CD is the median then $AD = BD$

ΔACB is a right angle Δ then $AD = BD = CD = 250$

By Pythagoras theorem :

$$x^2 + (x + 100)^2 = (500)^2$$

after solving $x = 300 \text{ km}$

Now, let they change their speeds after t_1 hours and then the rest time is t_2 then :

$$30t_1 + 40t_2 = 800 \quad \dots (i)$$

$$40t_1 + 30t_2 = 900 \quad \dots (ii)$$

After adding both equation (i) & equation (ii)

$$70(t_1 + t_2) = 1700$$

$$t_1 + t_2 = \frac{170}{7} \quad \dots (iii)$$

After subtracting both equation (i) & (ii) $-10t_1 + 10t_2 = -100$

$$t_1 - t_2 = 100 \quad \dots (iv)$$

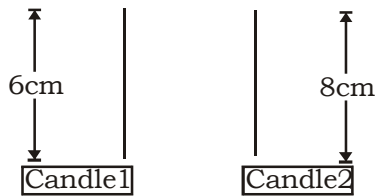
From equation (iii) & (iv)

$$t_1 = \frac{120}{7} \text{ hours, } t_2 = \frac{50}{7} \text{ hours}$$

So they will change their speed

after $\frac{120}{7}$ hours.

45. (d)



Rate of burning of Candle 1

$$= 5/5 = 1 \text{ cm/hour}$$

Rate of burning of Candle 2

$$= 6/4 = 1.5 \text{ cm/hour}$$

According to the question,

Let after x hours they will be equal

$$(6 - x) = (8 - 1.5x)$$

$$6 - x = 8 - 1.5x$$

$$\frac{1}{2}x = 2 \Rightarrow x = 4 \text{ hours}$$

46. (a) **Note** : (i) Always remember in such type of questions the given formula.

$$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$$

- (ii) Also remember we should take working hours not resting hours.

(a) working hours = $(24 - 9) = 15$ hours

(b) In second time working hours = $(24 - 18) = 6$ hours

Efficiency(E_1) : Efficiency (E_2)

$$1 : 2$$

$$= \frac{15 \times 40}{1} = \frac{2 \times 6 \times D}{2}$$

$$D = 100 \text{ days}$$

47. (a)

$$\frac{M_1 D_1 E_1 H_1}{W_1} = \frac{M_2 D_2 E_2 H_2}{W_2}$$

$$\frac{1 \times 20 \times 60}{1} = \frac{12 \times 3 \times D}{3}$$

$$D = 100 \text{ days}$$

48. (a) **Note- I** : In such type of questions always remember this below given formula :

$$\text{Distance} = \frac{xy}{x - y} \times (t_1 - t_2)$$

where $y \rightarrow$ First speed $x \rightarrow$ speed at second time t_1 and t_2 refer initial and later time.

Note-II : (i) In this question remember $t_2 - t_1$
 $= 10$ mins, because he takes 10 minutes to go to the point and returns to home.



Total late = 10 min

$$D = 8 \text{ km}, y = 4 \text{ km/h}, x = ?$$

$$(t_2 - t_1) = \frac{10}{60} \text{ hours}$$

put values in formula

$$\Rightarrow 8 = \frac{4x}{(x-4)} \times \frac{10}{60}$$

$$\Rightarrow 12x - 48 = x$$

$$11x = 48 \Rightarrow x = 4 \frac{4}{11} \text{ km/h}$$

49. (a)

Distance = 500 km,
time = 4 hours

Initial speed of the cyclist

$$= \frac{500}{4} = 125 \text{ km/h}$$

from question, New distance

= 450 km, New time = 5 hours

New speed of the cyclist

$$= \frac{450}{5} = 90 \text{ km/h}$$

% Reduction in speed

$$= \frac{\Delta s}{\text{actual speed}} \times 100$$

$$= \frac{(125-90)}{125} \times 100$$

$$= \frac{35}{125} \times 100 = 28\%$$

50. (a) From question,

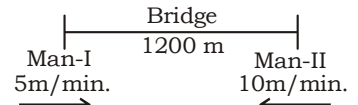
$$2d^2 = 25h \text{ (given)}$$

$$d = 10 \text{ km},$$

put in equation :-

$$2 \times 100 = 25h \Rightarrow h = 8 \text{ m}$$

51. (b)



Men are walking in opposite directions. Hence, they will cover the length of bridge at their relative speed.

 $\therefore$ Required time

$$= \frac{1200 \text{ m}}{(5 + 10) \text{ m/min}}$$

$$= \frac{1200}{15} \text{ min.} = 80 \text{ minutes}$$

52. (a) The gap of 114 metres will be filled at relative speed.

 $\therefore$ Required time

$$= \left(\frac{114}{21-15} \right) \text{ minutes} = \frac{114}{6}$$

$$= 19 \text{ minutes}$$

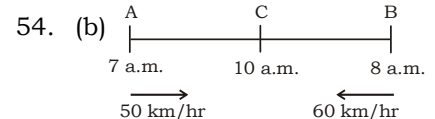
53. (d) Distance covered by A in 4 hours = $4 \times 4 = 16 \text{ km}$

Relative speed of B with respect to A = $10 - 4 = 6 \text{ km/hr}$ $\therefore$ Time taken by B to catch A =

$$\frac{16}{6} = \frac{8}{3} \text{ hours}$$

 $\therefore$ Required distance = $t \times v$

$$= \frac{8}{3} \times 10 = \frac{80}{3} = 26.67 \text{ km}$$



AC = Distance covered by train starting from A in 3 hours

$$= 50 \times 3 = 150 \text{ km}$$

BC = Distance covered by train starting from B in 2 hours

$$= 60 \times 2 = 120 \text{ km}$$

$$\therefore AC : BC = 150 : 120 = 5 : 4$$

55. (c) Let the speeds of the policeman and thief respectively are $5x$ and $4x \text{ km/hr}$

 $\therefore$ Relative speed = $5x - 4x = x \text{ km/hr}$ $\therefore$ Time taken to catch the thief

$$= \frac{100}{x} \text{ hours}$$

 $\therefore$ Distance covered by the thief

$$= \frac{100}{x} \times 4x = 400 \text{ metres}$$

56. (b) Relative speed = $90 - 75$

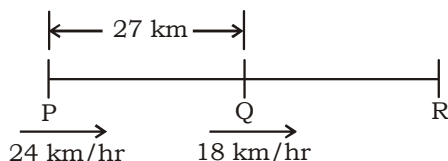
= 15 km/hr

∴ Required time

$$= \frac{\text{Distance}}{\text{Relative Speed}}$$

$$= \frac{5}{15} = \frac{1}{3} \text{ hr} = \frac{1}{3} \times 60 \text{ min} = 20 \text{ min}$$

57. (b)



Relative speed = $24 - 18$

= 6 km/hr

∴ Time required for meeting

$$= \frac{27}{6} = \frac{9}{2} \text{ hrs.}$$

∴ Distance between Q and R

$$= 18 \times \frac{9}{2} = 81 \text{ km}$$

58. (a) Relative speed = $11 - 10$

$$= 1 \text{ km/hr} = \frac{5}{18} \text{ m/s}$$

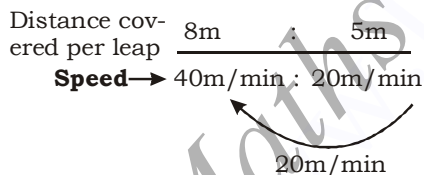
∴ Distance travelled in 6 minutes

$$= \frac{5}{18} \times 6 \times 60 = 100 \text{ m}$$

∴ Distance remained between them = $200 - 100 = 100 \text{ m}$

59. (c)

	Tiger	:	Deer
leaps taken per minute	5	:	4



Both are running in the same direction, so relative speed

$$= (40 - 20) = 20 \text{ m/min}$$

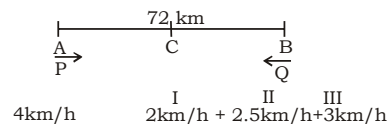
Actual distance between deer and tiger = $50 \times 8 = 400 \text{ m}$

Time taken by tiger to overtake

$$\text{deer} = \frac{400}{20} = 20 \text{ min}$$

distance travelled by tiger in 20 min = $20 \times 40 = 800 \text{ m}$

60. (a)



Let P and Q will meet after t hours.

Then distance travelled by P in t hours = $4t \text{ km}$

And distance travelled by Q

$$= \frac{t}{2} [2 \times 2 + (t-1) \times \frac{1}{2}]$$

$$= \frac{t}{2} \left[4 + \frac{t-1}{2} \right] = \frac{t}{2} \left[\frac{t+7}{2} \right]$$

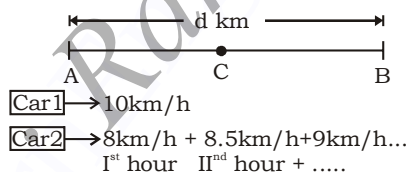
$$\left[\begin{array}{l} \text{from AP} \\ \text{sum} = \frac{n}{2} [2a + (n-1)d] \end{array} \right]$$

From question, Distance between A and B = 72 km

$$4t + \frac{t}{2} \left[\frac{t+7}{2} \right] = 72$$

Now take help from options Put $t = 9$, then both sides of the equation will be equal. So they will meet after 9 hours.

61. (a)



Let A is a point from where both the cars are moving toward the destination B, and C is a point where the car 2 overtakes the car 1.

Let after t hours the second car overtakes the first car.

Then equate the distance because both have travelled the same distance.

Distance covered by car 1 = distance covered by car 2

$$10t = \frac{t}{2} [2 \times 8 + (t-1) \times \frac{1}{2}]$$

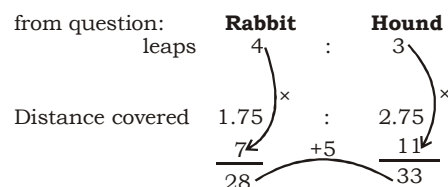
$$20 = 16 + \frac{t-1}{2}$$

$$t - 1 = 8 \Rightarrow t = 9 \text{ hours}$$

Distance covered by the first car in 9 hours = $9 \times 10 = 90 \text{ km}$

So after 90 km the second car will overtake the first car.

62. (a) From question :



Note:- To make calculation easier we find the ratio of distance covered by Rabbit and Hound.

Now from question Rabbit is 125 his own leaps ahead the hound.

In 1 leap, Rabbit covered the distance = 7 m

[Because we have calculated the Ratio]

then, in 125 leaps Rabbit ahead = $7 \times 125 \text{ m}$

Difference $(33 - 28) = 5 \text{ m}$ when hound takes 3 leaps

When difference 1 m then hound takes = $3/5$ leaps

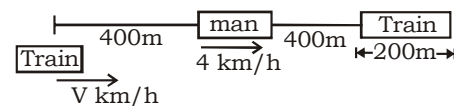
when difference 7×125 then hound takes

$$= \frac{3}{5} \times 7 \times 125 = 525 \text{ leaps}$$

63. (a) Let the speed of the train

$$= V \text{ km/h}$$

Speed of the man = 4 km/h (given)



Total distance covered by train = $400 + 400 + 200 = 1000 \text{ m}$

$$= 1 \text{ km}$$

Train & Man are moving in the same direction then relative speed

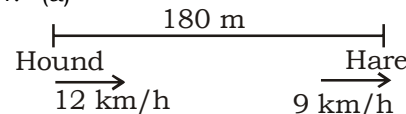
$$= (V - 4) \text{ km/h}$$

$$T = \frac{D}{V} \Rightarrow \frac{3}{60} = \frac{1}{(V-4)} = 3V -$$

$$12 = 60$$

$$\Rightarrow V = 24 \text{ km/h}$$

64. (a)



According to the question,

Hound chases Hare after 1 min then distance covered by Hare in 1 min

$$d = \frac{9 \times 5 \times 60}{18} = 150 \text{ m}$$

Total distance travelled by hound to catch rabbit = $(180 + 150) = 330\text{m}$

Now both are moving in same direction then relative speed = $(12 - 9)\text{km/h} = 3\text{ km/h}$

Time taken by hound to catch the Hare

$$= \frac{\text{distance}}{\text{relative speed}}$$

$$t = \frac{330 \times 18}{3 \times 5}, t = 396 \text{ sec}$$

Distance travelled by hound

$$= t \times v$$

$$= 396 \times 12 \times \frac{5}{18} = 1320 \text{ m}$$

65. (a)

	Hound		Hare
leaps	4	:	6
distance	2.5	:	1.5
covered	5	:	3
	20m		18m

$\ominus 2\text{m}$

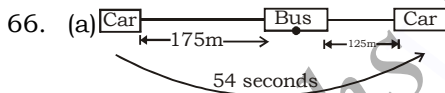
Now Hare is ahead 400 his own leaps then distance = $400 \times 3\text{m}$
difference 2 m when hound takes 4 leaps

difference 1 m when hound takes

$$\frac{4}{2} \text{ leaps}$$

difference 400×3 when hound takes

$$= \frac{4}{2} \times 400 \times 3 = 2400 \text{ leaps}$$



speed of the car = 60 km/h

assume speed of the bus = $V\text{ km/h}$

Both car and bus moving in same direction then relative speed = $(60 - v)$.

$$\text{we know } \Rightarrow t = \frac{d}{v}$$

$$54 = \frac{(175+125) \times 18}{(60-v) \times 5}$$

$$\Rightarrow 900 - 15v = 300$$

$$\Rightarrow 15v = 600$$

$$v = 40\text{ km/h}$$

67. (a) **Note** :- In this question in both cases P is late. So we can say P travels more distance than Q.

Now let speed of P and Q respectively is $x\text{ km/h}$ and $y\text{ km/h}$.

$$\text{from condition (i), } \frac{150}{x} - \frac{100}{y}$$

$$= 1 \dots (i) \times 2$$

$$\text{from condition (ii) } \frac{150}{y} - \frac{100}{x} = \frac{8}{3}$$

$$\dots (ii) \times 3$$

multiply in equation (i) by 2 and in equation (ii) by 3

$$\frac{300}{x} - \frac{200}{y} = 2$$

$$\frac{450}{y} - \frac{300}{x} = 8$$

$$\frac{250}{y} = 10 \Rightarrow y = 25\text{ km/h}$$

Put $y = 25\text{ km/h}$ in equation (i)

$$\text{then } \frac{150}{x} - \frac{100}{25} = 1$$

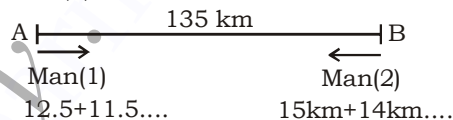
$$\frac{150}{x} = 5 \Rightarrow x = 30\text{ km/h}$$

Speed of P and Q

$$\Rightarrow x = 30\text{ km/h}$$

$$y = 25\text{ km/h}$$

68. (a)



Both the men are moving in opposite direction then relative speed in the first hour

$$= 12.5 + 15 = 27.5\text{ km/h}$$

similarly it reduces 2 km for every hour.

Let they will meet after t hours

$$\text{then } \frac{t}{2} [2 \times 27.5 + (t-1) \times -2] = 135$$

$$[\therefore d = -2]$$

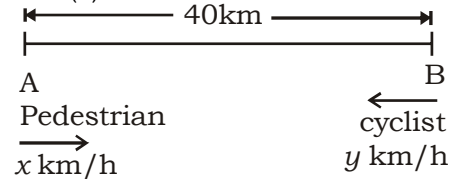
$$t = 6 \text{ hours}$$

(ii) distance from A travelled by man in 6 hours

$$= \frac{6}{2} [2 \times 12.5 + (6-1) \times -1]$$

$$[d = -1] = 3 \times 20 = 60\text{ km}$$

69. (a)



Let the speed of pedestrian and cyclist is $x\text{ km/h}$ and $y\text{ km/h}$ respectively.

According to the question,

Condition (i):-

They meet after hours.

$$2(x + y) = 40$$

$$x + y = 20 \dots (i)$$

Condition (ii):-

Cyclist arrives at A, 7 hours 30 minutes earlier than Pedestrian.

Now take help from options,

Speed of Pedestrian = 4 km/h

Speed of cyclist = 16 km/h

Time taken by the pedestrian

$$= \frac{40}{4} = 10 \text{ hours}$$

$$\text{Time taken by the Cyclist} = \frac{40}{16}$$

$$= 2 \text{ hours } 30 \text{ minutes}$$

difference in time = 7 hours 30 mins which is also mention in question.

So option (a) is correct.

70. (d) First ant covers 8% in 3 hours is given

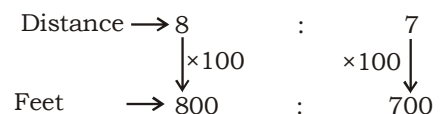
similarly % distance covered by second ant in 3 hours

$$= \frac{7 \times 2 \times 3 \times 100}{120 \times 5} = \frac{7}{100} \times 100 = 7\%$$

From question : Both the ants are moving in opposite direction so total distance covered by them = $(8 + 7) = 15\%$ in 3 hours.

distance covered in 1 hour = 5%

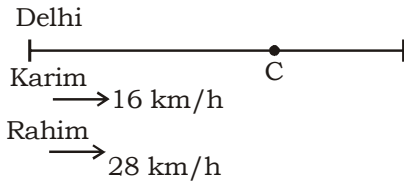
Ant 1 : **Ant 2**



Speed of the second ant = 700

$$\times \frac{5}{100} = 35 \text{ feet/hour}$$

71. (c)



Let Rahim and his friend overtake Karim at point C. Distance covered by Karim in 4 hours

$$= 24 + 16 = 40 \text{ km.}$$

Now All move in the same direction.

Then time taken in overtaking

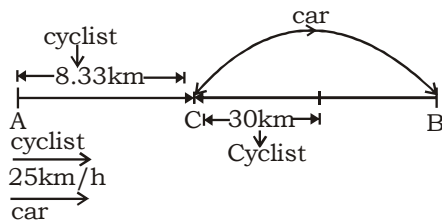
$$= \frac{40}{(28-16)} = \frac{40}{12} = \frac{10}{3} \text{ hours}$$

Distance covered by them = $t \times v$

$$= \frac{10}{3} \times 28$$

$$= \frac{280}{3} = 93.33 \text{ km}$$

72. (c)



time taken by cyclist to cover 8.33 km

$$t = \frac{25}{3 \times 25} \times 60$$

$$= 20 \text{ min} \left[\because 8.33 = 8 + \frac{1}{3} \right]$$

Note : The car travelled 12 min later than the cyclist.

Then

Car : Cyclist

Time $\rightarrow$ 8	:	20
Speed $\rightarrow$ 5	:	2
$\times 12.5$		$\times 12.5$
$\frac{125}{2} \text{ km/h}$		25 km/h

From question, Time to travel 30

$$\text{km by cyclist- } t = \frac{30}{25} \text{ hours}$$

Distance travelled by the car

$$\text{when } t = \frac{30}{25} \text{ hours}$$

$$D = \frac{30}{25} \times \frac{125}{2} = 75 \text{ km}$$

Now,

Twice the distance b/w C and B is $\Rightarrow 75 + 30 = 105 \text{ km}$

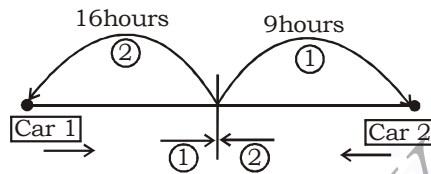
Distance b/w C and B is

$$= \frac{105}{2} = 52.5 \text{ km}$$

Total distance between A and B = $8.33 + 52.5$

$$= 60.833 \text{ km.}$$

73. (a)



Let the speed of the car₁ and car₂ is $x \text{ km/h}$ and $y \text{ km/h}$ respectively.

$$\text{Now use the formula } \frac{S_1}{S_2} = \sqrt{\frac{T_2}{T_1}}$$

$$\frac{x}{y} = \sqrt{\frac{16}{9}} \Rightarrow \frac{x}{y} = \frac{4}{3}$$

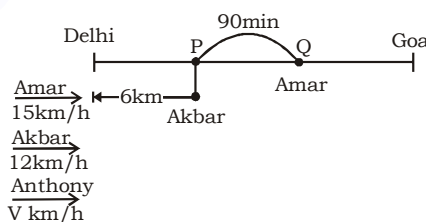
Total distance between A and B = $16 \times 3 + 9 \times 4 = 84 \text{ km.}$

Time taken by the slowest car to

$$\text{travel whole journey } t = \frac{84}{3} \Rightarrow t$$

$$= 28 \text{ hours.}$$

74. (a)



Let the speed of Anthony = $V \text{ km/h}$ from question :

Condition (i):-

Time taken by Anthony to overtake the Akbar.

$$t = \frac{6}{(V-12)} \quad \dots (i)$$

Till this time distance covered by Amar

$$D_1 = \frac{15}{2} + \left(\frac{6}{V-12} \right) 15$$

Till this time total distance covered by Anthony

$$D_2 = \left(\frac{6}{V-12} \right) V$$

Difference in distance $D = D_1 - D_2$

$$D = \left(\frac{15}{2} + \frac{90}{V-12} \right) - \left(\frac{6V}{V-12} \right)$$

$$D = \left(\frac{3V}{2V-24} \right)$$

Condition (II):-

Time taken by Anthony to overtake Amar

$$= 90 \text{ min} = \frac{3}{2} \text{ hours}$$

$$\frac{3}{2} = \frac{3V}{(2V-24)(V-15)}$$

$$V^2 - 28V + 180 = 0$$

$$V^2 - 18V - 10V + 180 = 0$$

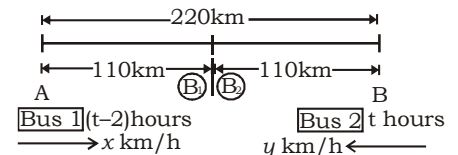
$$V = 18 \text{ km/h, } V = 10 \text{ km/h}$$

$V = 10 \text{ km/h}$ can not be possible because Antony overtakes Amar and Akbar so speed would be $V = 18 \text{ km/h}$

Or, $V > 12 \text{ km/h}$ and 15 km/h

So $V = 18 \text{ km/h}$

75. (c)



Let the speed of two buses is $x \text{ km/h}$ and $y \text{ km/h}$ respectively.

From question:

Condition (i):-

Buses meets at halfway then $x(t-2) = y(t) = 110 \quad \dots (i)$

Condition (ii):-

When they start simultaneously :

$$4(x+y) = 220$$

$$x+y = 55 \quad \dots (ii)$$

From equation (i) & equation (ii):

$$x = \frac{110}{(t-2)}, y = \frac{110}{t} \text{ put in equation (ii)}$$

$$\frac{110}{(t-2)} + \frac{110}{t} = 55$$

$$t^2 - 6t + 4 = 0 \quad [\text{after solving}]$$

$$t = 3 \pm \sqrt{5}$$

Possible values of time

$$= (3 + \sqrt{5}) \text{ and } (3 - \sqrt{5})$$

When time is maximum

$$(t = 3 + \sqrt{5}) \text{ put it in equation (i)}$$

$$y = \frac{110}{(3+\sqrt{5})(3-\sqrt{5})}$$

$$= \frac{110(3-\sqrt{5})}{4}$$

$$y = 27.5(3 - \sqrt{5}) \text{ km/h}$$

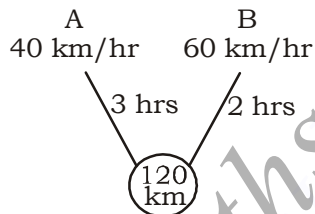
Similarly

$$x = \frac{110}{(1+\sqrt{5})} \frac{(\sqrt{5}-1)}{(\sqrt{5}-1)}$$

$$= \frac{110(\sqrt{5}-1)}{4}$$

$$x = 27.5(\sqrt{5}-1) \text{ km/h}$$

76. (a) Let the distance b/w Mysore and Bangalore = LCM of (40, 60) = 120 km



∴ Average speed

$$= \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{120 + 120}{3 + 2} = \frac{240}{5} = 48 \text{ km/hr}$$

77. (b) Average speed

$$= \frac{\text{Total distance}}{\text{Total time}} = \frac{30 + 40}{\left(\frac{30}{6} + 8\right)}$$

$$= \frac{70}{13} = 5 \frac{5}{13} \text{ km/hr}$$

78. (a) **Note** : in such type of questions to save your valuable time assume the distance be LCM of (speeds).

Speed $S_1 = 10 \text{ km/h}$, $S_2 = 20 \text{ km/h}$, $S_3 = 30 \text{ km/h}$

Distance = LCM (10, 20, 30) = 60 km

$$\text{avg. speed} = \frac{\text{Total distance}}{\text{total time}}$$

$$= \frac{60 \times 3}{\frac{60}{10} + \frac{60}{20} + \frac{60}{30}} = \frac{180}{6 + 3 + 2}$$

$$= 16 \frac{4}{11} \text{ km/hr}$$

Alternatively:-

assume total distance = d km

$$\text{average speed} = \frac{3d}{\frac{d}{10} + \frac{d}{20} + \frac{d}{30}}$$

$$= \frac{3d}{d[6+3+2]} = \frac{180d}{11d}$$

$$= 16 \frac{4}{11} \text{ km/h}$$

79. (a) Let the total distance be 100 km.

Average speed

$$= \frac{\text{Total distance}}{\text{Total Time}}$$

$$= \frac{100}{\frac{30}{20} + \frac{60}{40} + \frac{10}{10}}$$

$$= \frac{100}{\frac{3}{2} + \frac{3}{2} + 1} = \frac{100}{4} = 25 \text{ km/hr}$$

80. (a) **Note** : Always remember this formula for average speed.

Average speed

$$= \frac{\text{Total distance}}{\text{Total time}}$$

$$\text{Time taken by train} = \frac{40}{20}$$

$$= 2 \text{ hours}$$

$$\text{Time taken by Car} = \frac{60}{10} = 6 \text{ hours}$$

$$\text{Time taken by bus} = \frac{30}{15}$$

$$= 2 \text{ hours}$$

$$\text{Time taken by Aeroplane} = \frac{80}{25}$$

$$= 3.2 \text{ hours}$$

$$\text{Time taken by Ship} = \frac{120}{30} = 4 \text{ hours}$$

average speed

$$= \frac{40+60+30+80+120}{2+6+2+3.2+4}$$

$$= \frac{3300}{17.2} = \frac{825}{4.3} = 19 \frac{8}{43} \text{ km/hr}$$

$$\text{average speed} = 19 \frac{8}{43} \text{ km/hr.}$$

- (ii) Time taken to travel 825 km

$$= \frac{825}{19 \frac{8}{43}} \times 43 = 43 \text{ hours}$$

81. (a) Average speed

$$= \frac{\text{Total distance}}{\text{total time}}$$

distance = 70 km

average speed

$$= \frac{70}{\frac{15}{10} + \frac{10}{15} + \frac{20}{25} + \frac{25}{25}} = \frac{70 \times 6}{25} \text{ km/h}$$

from equation :

A bus travels the returning journey at a speed of $\frac{5}{12}$ of the former speed.

$$\text{Then new speed} = \frac{70 \times 6}{25} \times \frac{5}{12}$$

$$= 7 \text{ km/h}$$

Time taken to travel whole journey with the new Speed

$$= \frac{\text{distance}}{\text{speed}} = \frac{70}{7} = 10 \text{ hours}$$

82. (a) Total distance = 200 km

(i) Time taken by the man to travel 200 km.

total time

$$= \left(\frac{50}{40} + \frac{50}{45} + \frac{50}{50} + \frac{50}{55} \right) \text{ hours}$$

- (ii) Time taken by the man (in returning) or to travel 200 km

Total time in returning

$$= \left(\frac{50}{10} + \frac{50}{20} + \frac{50}{30} + \frac{50}{40} \right)$$

Now total distance = $200 + 200 = 400$ km

Total time

$$= \left(\frac{50}{40} + \frac{50}{45} + \frac{50}{50} + \frac{50}{55} \right) + \left(\frac{50}{10} + \frac{50}{20} + \frac{50}{30} + \frac{50}{40} \right)$$

hrs

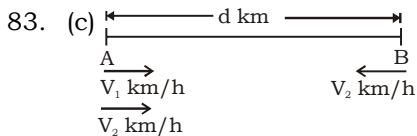
we know, avg. speed

$$= \frac{\text{total distance}}{\text{total time}}$$

average speed

$$= \frac{400}{\left(\frac{50}{40} + \frac{50}{45} + \frac{50}{50} + \frac{50}{55} \right) + \left(\frac{50}{10} + \frac{50}{20} + \frac{50}{30} + \frac{50}{40} \right)}$$

average speed = 27.5 km/h (approx.)



Let the distance between A and B is d km.

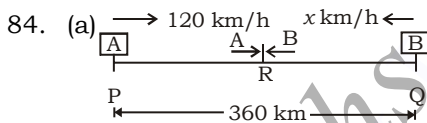
Average speed

$$= \frac{\text{Total distance}}{\text{Total time}}$$

$$\text{Average speed} = \frac{d+d+d}{\frac{d}{v_1} + \frac{d}{v_2} + \frac{d}{v_2}}$$

$$= \frac{3d}{\frac{d}{v_2+v_1+v_1}}$$

$$\text{Average speed} = \frac{3v_1v_2}{v_2+2v_1}$$



According to the question,

A takes 3 hours to meet Q then total distance between P and Q = $3 \times 120 = 360$ km

Let the speed of B is x km/h

(i) Both are moving in opposite direction then :

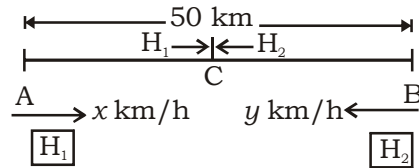
$$2 = \frac{360}{120+x} \Rightarrow 120 + x = 180$$

$$x = 60 \text{ km/h}$$

Ratio of speeds = 120 : 60

$$= 2 : 1$$

(ii) Speed of B = 60 km/h.



Let the speeds of two horses (H_1 , H_2) is x km/h and y km/h respectively.

From question,

Condition (I):-

They meet after an hour. C is a point where the horses meet.

$$x + y = 50 \quad \dots (i)$$

Condition (II):-

H_1 reaches 5/6 hours earlier than the second horse H_2 .

$$\frac{50}{y} - \frac{50}{x} = \frac{5}{6} \quad \dots (ii)$$

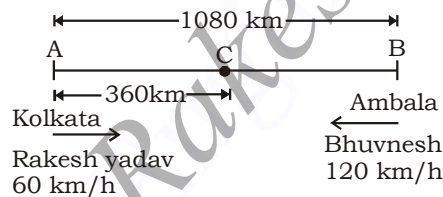
Now help from options put y

$$= 20 \text{ km/h then } x = 30 \text{ km/h}$$

So, speed of the slower horse

$$= 20 \text{ km/h}$$

86. (b)



Let C is a point where all the three meet.

Time taken to meet Rakesh Yadav and Bhuvnesh

$$= \frac{1080}{(60+120)} = 6 \text{ hours}$$

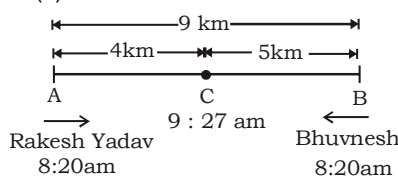
So in 6 hours distance covered by Rakesh Yadav = $6 \times 60 = 360$ km

Time taken by Pawan to travel 360 km

$$= \frac{360}{90} = 4 \text{ hours}$$

Hence, pawan leaves Kolkata 2 hours later than Rakesh Yadav i.e. at 8 am pawan leaves Kolkata.

87. (c)



Let the distance between A and

B is 9 km, and C is a point where Rakesh Yadav and Bhuvnesh meet. As they started at the same time so they will travel the distance in the ratio of their speeds.

From question,

Rakesh Yadav reaches at B after 65 mins from meeting.

Time to travel 5 km = 65 min

$$\text{Time to travel 1 km} = \frac{65}{5} \text{ min}$$

$$\text{Time to travel 4 km} = \frac{65}{5} \times 4$$

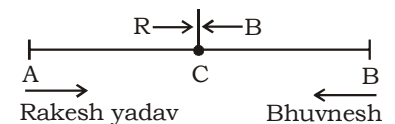
$$= 52 \text{ min.}$$

But he took (9 : 27 - 8 : 20)

$$= 67 \text{ min.}$$

It means he must have stayed at C for 15 minutes.

88. (b)



Let the time taken by Rakesh Yadav in going from A to C is x minutes and the time taken by Bhuvnesh in going from B to C is y min.

from question :

Condition (I):-

The new speed of Rakesh Yadav is 2/3, Therefore time taken in

$$\text{returning} = \frac{3}{2} x$$

$$x + \frac{3}{2} x = 120$$

$$x = 48 \text{ min}$$

But $x = y$ (given)

Condition (II):-

The new speed of Bhuvnesh is $\frac{4}{3}$

$$\text{time taken in returning} = \frac{3}{4} y$$

$$\text{Total time} = y + \frac{3}{4} y$$

$$= 48 + \frac{3}{4} \times 48 = 84 \text{ min.}$$

89. (c)

leaps taken per minute	Dog 5	:	Cat 4
Distance covered per leap	8m	:	5m
Speed	40m/min	:	20 m/min
	20m/min		

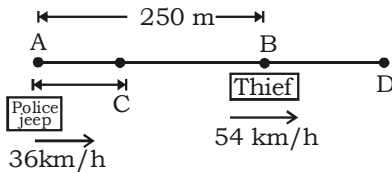
Both are running in the same direction so relative speed
= 20m/min

Actual distance between cat and dog = $50 \times 8 = 400\text{m}$

Time taken by dog to overtake cat = $\frac{400}{20} = 20 \text{ min}$

distance travelled by dog in 20 min = $20 \times 40 = 800\text{m}$

90. (b)



From question,

Condition (i):-

Thief takes 5 seconds to realize then distance covered by jeep in this time

$$= 5 \times 36 \times \frac{5}{18} = 50 \text{ m}$$

Now jeep is at point C.

Condition (ii):-

But police realize after 10 seconds then the extra distance covered by thief

$$= 18 \times \frac{5}{18} \times 10 = 50 \text{ m}$$

Now the thief is at point D.

Now police has increased his speed to 72 km/h.

$$\text{Relative speed} = (72 - 54) = 18 \text{ km/h}$$

Time taken in overtaking

$$= \frac{250 \times 18}{18 \times 5} = 50 \text{ seconds}$$

$$\text{Total time} = 5 + 10 + 50 = 65 \text{ seconds}$$

Total distance travelled by Police

$$= 15 \times 36 \times \frac{5}{18} + 50 \times 72 \times \frac{5}{18}$$

$$150 + 1000 = 1150 \text{ m}$$

91. (b)

No. of steps moved	Leopard → 3	:	Tiger 5
Ratio of steps	→ 4	:	5
Ratio of Rounds	→ 12	:	25
	↓ ×4	:	↓ ×4
	48	:	100

Hence, leopard makes 48 rounds, when tiger makes 100 rounds.

92. (b) Let the total distance covered by the car = $2d \text{ km}$

According to the question,

$$\frac{d}{40} + \frac{d}{60} = 10$$

$$\frac{3d+2d}{120} = 10$$

$$\text{Now } d = 240$$

$$\text{total distance} = 2d = 2 \times 240 = 480\text{km}$$

Alternatively:-

Average speed

$$= \frac{2 \times 40 \times 60}{(60 + 40)} = 48 \text{ km/hr}$$

$$\text{Total distance} = 48 \times 10 = 480 \text{ km}$$

93. (d) Let initial time = t , distance = $2d$, speed = S_1

$$\therefore 2d = S_1 \times t \dots\dots(i)$$

and final, Distance = d , time

$$= 2t \text{ \& speed } = S_2$$

$$\therefore d = S_2 \times 2t \dots\dots(ii)$$

$$\therefore \text{From (i) \& (ii),}$$

$$2 = \frac{S_1}{2S_2} \Rightarrow \frac{S_1}{S_2} = \frac{4}{1}$$

94. (c) Let the tourists spent x hours to travel on foot and y hours to travel by tonga.

From question;

Condition (I):-

$$x - y = 4 \dots\dots(i)$$

Speed of tourists on foot

$$= \frac{90}{x} \text{ km/h}$$

Speed of tourists by tonga

$$= \frac{10}{y} \text{ km/h}$$

Condition (II):-

If he had reversed the time then he travels equal distance.

$$\frac{90}{x}y = \frac{10}{y}x$$

$$9y^2 = x^2$$

$$\Rightarrow x = 3y \dots\dots(ii)$$

from equation (i) \& (ii)

$$3y - y = 4$$

$$\Rightarrow y = 2 \text{ hours}$$

$$x = 6 \text{ hours}$$

He rode 2 hours by tonga.

Alternate:-

To do your calculations so quickly take help from options.

Option (c): Time for tonga = 2 hours,

Then time on foot = $2 + 4 = 6$ hours

$$\text{Speed (Tonga)} = \frac{10}{2} = 5 \text{ km/h}$$

$$\text{Speed (foot)} = \frac{90}{6} = 15 \text{ km/h}$$

now from question,

	Tonga	:	foot
Speed	5	:	15
	×		
(reverse) Time	6	:	2
	30km d_1	:	30km d_2

$$d_1 = d_2$$

So option (c) is correct.

95. (b) From question :

Condition (I):-

The movement of the ant in first case : $3, 3 + 4, 7 + 4, 11 + 4, 15 + 4, 19 + 4, \dots$

Condition (II):-

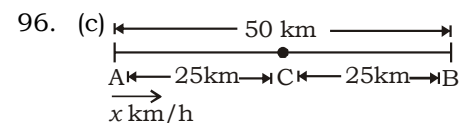
The movement of the ant in first case :

$1, 1 + 8, 9 + 8, 17 + 8, 25 + 8, 33 + 8, \dots$

difference in 4th second

$$= 25 - 15 = 10 \text{ mm}$$

Thus it is clearly seen that the ant moved for 4 seconds.



Let the speed of motorcyclist is $x \text{ km/h}$

Note:- In such type of question use this formula-

$$\text{Distance} = \frac{xy}{x-y} \times (t_2 - t_1)$$

We already explained this formula earlier.

$$D = 25 \text{ km}$$

$$25 = \frac{x(x+10)}{10} \times \frac{5}{60}$$

$$x(x+10) = 3000$$

$$\begin{array}{c} \swarrow \quad \searrow \\ 50 \times 60 \end{array}$$

make two factors which have difference of 10 or help from options to save your time.

Speed of motor cyclist = 50 km/h

97. (b) One way walking + one way riding time

$$= 37 \text{ minutes} \quad \dots (i)$$

& Two ways walking time = 55 min.

$$\therefore \text{One way walking time} = \frac{55}{2}$$

$$= 27.5 \text{ min}$$

$$\therefore \text{From (i), One way riding time} = 37 - 27.5 = 9.5 \text{ min}$$

$$\therefore \text{Two ways riding time}$$

$$= 9.5 \times 2 = 19 \text{ minutes.}$$

98. (d) One way walking + one way riding time

$$= 4 \text{ hours } 30 \text{ min}$$

$$= \frac{9}{2} \text{ hrs} \quad \dots (i)$$

and Two ways riding time = 3 hrs

$$\therefore \text{One way riding time} = 3/2 \text{ hrs}$$

$$\therefore \text{From (i), one way walking time}$$

$$= \frac{9}{2} - \frac{3}{2} = \frac{6}{2} = 3 \text{ hours}$$

$$\therefore \text{Two ways walking time} = 2 \times 3 = 6 \text{ hours}$$

99. (c) One way walking + One way riding time

$$= 6 \text{ hr } 15 \text{ min} = \frac{25}{4} \text{ hrs} \quad \dots (i)$$

Two ways walking = 7 hr 45 min

$$= \frac{31}{4} \text{ hrs}$$

$$\therefore \text{One way walking time} = \frac{31}{8} \text{ hrs}$$

$$\therefore \text{from (i)}$$

One way riding time

$$= \frac{25}{4} - \frac{31}{8} = \frac{50-31}{8} = \frac{19}{8} \text{ hrs}$$

$$\therefore \text{Two ways riding time}$$

$$= \frac{19}{8} \times 2 = \frac{19}{4} \text{ hrs}$$

$$= 4 \frac{3}{4} \text{ hrs} = 4 \text{ hr} \left(\frac{3}{4} \times 60 \right) \text{ min}$$

$$= 4 \text{ hr } 45 \text{ min}$$

100. (c) **Note** : In such type of questions always remember this formula :

$$\text{Distance} = \frac{xy}{x-y} \times (t_2 - t_1)$$

where : $x \rightarrow$ first speed,

$y \rightarrow$ speed at second time

from question : $x = 8 \text{ km/h}$, $y = 10 \text{ km/h}$,

$$(t_2 - t_1) = (5 + 2.5) = 15/2 \text{ min}$$

put all values in the above formula

$$D = \frac{8 \times 10}{(10-8)} \times \frac{15}{2 \times 60} = 5 \text{ km}$$

- 101 (d) Let the initial speed of Rakesh Yadav = $S \text{ km/h}$

Now according to the question:

Condition (i):-

When Rakesh Yadav increases his speed then,

$$(D_1) \text{ Distance} = \frac{S(S+3)}{3} \times \frac{40}{60} \quad \dots (i)$$

Condition (ii):-

When Rakesh Yadav decreases his speed then,

$$(D_2) \text{ Distance} = \frac{S(S-2)}{3} \times \frac{40}{60}$$

$\therefore$ Both the distance would be equal.

$$\therefore D_1 = D_2$$

$$\frac{S(S+3)}{3} \times \frac{40}{60} = \frac{S(S-2)}{3} \times \frac{40}{60}$$

$$S = 12 \text{ km/h, put value in equ. (i)}$$

$$\text{Distance} = \frac{12 \times 15}{3} \times \frac{40}{60} = 40 \text{ km}$$

Alternate:-

$$\left. \begin{array}{l} S \quad T \\ +3 \quad -40 \end{array} \right\} \quad 3T - 40S = -120 \quad \dots (i)$$

$$\left. \begin{array}{l} S \quad T \\ -2 \quad +40 \end{array} \right\} \quad -2T + 40S = -80 \quad \dots (ii)$$

from equation (i) & (ii)

$$3T - 40S = 120$$

$$-2T + 40S = 80$$

$$\text{On adding} \Rightarrow T = 200 \text{ min}$$

put value in equation (i)

$$S = 12 \text{ km/h}$$

$$\text{Distance} = S \times T = \frac{200}{60} \times 12$$

$$= 40 \text{ km}$$

Note:- Where $D \rightarrow$ distance, $S \rightarrow$ Speed, $T \rightarrow$ Time

'+' means increase in value.

and '-' means decrease in value.

102. (a) Let the required distance

$$= \text{LCM of } (42, 35) = 210 \text{ km}$$

$$42 \text{ km/hr} \quad 35 \text{ km/hr}$$

$$\begin{array}{c} \swarrow \quad \searrow \\ 5 \text{ hrs} \quad 6 \text{ hrs} \end{array}$$

$$(210)$$

$$\therefore \text{Difference in time} = 6 - 5$$

$$= 1 \text{ hour} = 60 \text{ minutes}$$

But the given difference

$$= 15 + 5 = 20 \text{ min}$$

$$\text{i.e. } 60 \text{ units} \longrightarrow 20$$

$$\Rightarrow 210 \text{ units} \longrightarrow \frac{20}{60} \times 210 = 70$$

Hence, the required distance

$$= 70 \text{ km}$$

103. (d) Let the distance to his school

$$= \text{LCM of } (4, 5) = 20 \text{ km}$$

$$4 \text{ km/hr} \quad 5 \text{ km/hr}$$

$$\begin{array}{c} \swarrow \quad \searrow \\ 5 \text{ hrs} \quad 4 \text{ hrs} \end{array}$$

$$(20 \text{ km})$$

$$\therefore \text{difference in time} = 5 - 4 = 1$$

$$\text{hour} = 60 \text{ min}$$

But, the given difference

$$= 9 + 9 = 18 \text{ min}$$

$$\text{i.e. } 60 \text{ Units} \longrightarrow 18$$

$$20 \text{ Units} \longrightarrow \frac{18}{60} \times 20 = 6$$

$$\text{i.e. the required distance} = 6 \text{ km}$$

104. (c) $x = 30 \text{ km/h}$, $y = 24 \text{ km/h}$

$$(t_2 - t_1) = (6 + 5) \text{ min} = \frac{11}{60} \text{ hours}$$

$$\text{Distance} = \frac{xy}{x-y} \times t_2 - t_1$$

Note:- We have explained the each term of formula in earlier examples.

$$\text{Distance} = \frac{30 \times 24}{30 - 24} \times \left(\frac{11}{60} \right)$$

$$= \frac{30 \times 24}{6} \times \frac{11}{60} = 22 \text{ km}$$

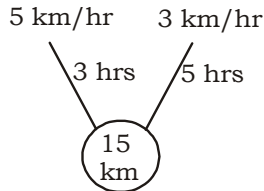
Alternate:-

We are seeing here ($t_2 - t_1$)

$$= \frac{11}{60} \text{ hours}$$

So by hit and trial Distance would be the multiple of 11. So option (c) is correct.

105. (c) Let the distance between his school and house = LCM of (5, 3) = 15 km



$\therefore$ Time difference = $5 - 3 = 2$ hours = 120 minutes
but, the given time difference = $15 + 9 = 24$ min.

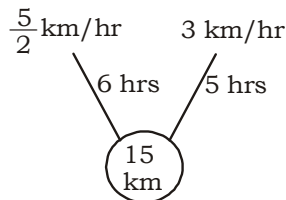
i.e. $120 \text{ units} \longrightarrow 24$

$$\Rightarrow 15 \text{ units} \longrightarrow \frac{24}{120} \times 15 = 3$$

i.e., the required distance = 3 km

106. (b) Let the distance between his school and house = LCM of

$$\left(2\frac{1}{2}, 3\right) = 15 \text{ km}$$



$\therefore$ Time difference = $6 - 5 = 1$ hour = 60 minutes

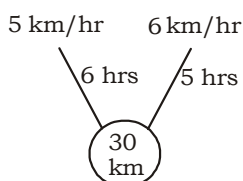
But, the given time difference = $6 + 10 = 16$ minutes

i.e. $60 \text{ units} \longrightarrow 16$

$$\Rightarrow 15 \text{ units} \longrightarrow \frac{16}{60} \times 15 = 4$$

i.e. the required distance = 4 km

107. (a) Let the required distance = LCM of (5, 6) = 30 km



$$\therefore \text{Time difference} = 6 - 5 = 1 \text{ hr} = 60 \text{ min}$$

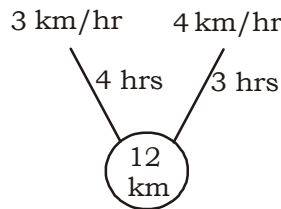
But, the given time difference = $7 + 5 = 12$ minutes

i.e. $60 \text{ units} \longrightarrow 12$

$$\Rightarrow 30 \text{ units} \longrightarrow \frac{12}{60} \times 30 = 6$$

i.e., the required distance = 6 km

108. (d) Let the required distance = LCM of (3, 4) = 12 km



$\therefore$ Time difference = $4 - 3 = 1$ hr = 60 min

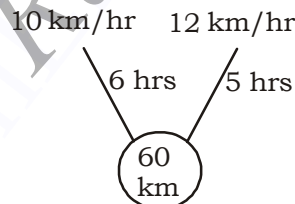
But, the given time difference = $20 + 10 = 30$ minutes

i.e. $60 \text{ units} \longrightarrow 30$

$$\therefore 12 \text{ units} \longrightarrow \frac{30}{60} \times 12 = 6$$

i.e. the required distance = 6 km

109. (c) Let the required distance = LCM of (10, 12) = 60 km



$\therefore$ Difference in time = $6 - 5 = 1$ hour = 60 minutes

but the given difference in time = $6 + 6 = 12$ minutes

i.e. $60 \text{ units} \longrightarrow 12$

Hence, the required distance = 12 km

110. (a) Initial speed of man = 5 km/h
New speed of man = 6 km/h

$$\text{Distance} = \frac{xy}{x-y} (t_2 - t_1)$$

$$t_2 - t_1 = 10 - 5 = 5 \text{ min} = 1/12 \text{ hour}$$

put all values in the above formula.

$$D = \frac{5 \times 6}{1} \times \frac{1}{12} = 2.5 \text{ km}$$

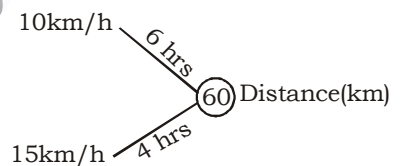
$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$\text{Time} = \frac{2.5}{5} = 30 \text{ min}$$

Note:- When he travels with a speed of 5 km/h then he takes 10 min. It means he would be travel the same distance in 20 minutes to reach destination on time.

$$\text{New speed} = \frac{2.5}{20} \times 60 = 7.5 \text{ km/h}$$

111. (d) Initial speed of the man = 10 km/h
when he increases this speed by 5 km/h then new speed of the man = 15 km/h



$$\text{Time} \Rightarrow 1 \text{ pm} - 11 \text{ pm}$$

Difference = 2 hours

Distance (D) = 60 km

To reach destination at 12 noon
required time = 5 hours

$$\therefore \text{Speed} = \frac{\text{distance}}{\text{time}} \Rightarrow \text{Speed}$$

$$= \frac{60}{5} = 12 \text{ km/h}$$

- 112 (a)

$$\left. \begin{array}{l} S \quad T \\ +6 \quad -4 \end{array} \right\} -4S + 6T = 24 \dots (i)$$

$$\left. \begin{array}{l} S \quad T \\ -4 \quad +4 \end{array} \right\} 4S - 4T = 16 \dots (ii)$$

from equation (i) & (ii)

$$\begin{array}{r} -4S + 6T = 24 \\ 4S - 4T = 16 \\ \hline \end{array}$$

On adding, $2T = 40$

$$\Rightarrow T = 20 \text{ hours}$$

put in equ. (ii)

$$4S - 80 = 16 \Rightarrow S = 24 \text{ km/h}$$

$$\text{Distance} = t \times S = 24 \times 20 = 480 \text{ km}$$

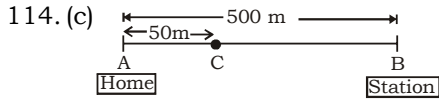
$$\begin{aligned} 113. (c) \quad & \left. \begin{array}{l} S \quad T \\ +2 \quad -60 \end{array} \right\} -60S + 2T = 120 \dots (i) \\ & \left. \begin{array}{l} S \quad T \\ -1 \quad +40 \end{array} \right\} 40S - T = 40 \dots (ii) \end{aligned}$$

after solving equation (i) & (ii)

$$S = 10 \text{ km/h, } T = 360 \text{ min}$$

$$= 6 \text{ hours}$$

$$\text{Distance} = t \times S = 6 \times 10 = 60 \text{ km}$$



Rakesh yadav $\rightarrow$ 1 km/h

C is a point where Rakesh Yadav reaches after 3 minutes

distance covered in 3 minutes =

$$3 \times \frac{1000}{60} = 50 \text{m}$$

Initially time taken by Rakesh Yadav to reach at Station (t)

$$= \frac{1}{2 \times 1} \text{ hour} = 30 \text{ minutes}$$

$$\text{Now remaining time} = (30 - 3) = 27 \text{ minutes}$$

Now he has to cover (500 + 50)m = 550m in remaining time (27 minutes)

$$\text{New speed} = \frac{550 \times 60}{27 \times 1000} = \frac{11}{9} \text{ km/h}$$

115. (a) Assume the car travels for x hours at speed of 6 km/h and travels y hours at the speed of 10 km/hr.

Then total time = (x + y) hours

$$\text{from condition (i)} \quad 6x + 10y = 140 \dots (i)$$

$$\text{from condition (ii)} \quad 10x + 6y = 148 \dots (ii)$$

Note:- To solve such equations add both the equations to make it is easier.

$$16x + 16y = 288$$

$$16(x + y) = 288$$

$$\Rightarrow x + y = 18 \text{ hours}$$

average speed

$$= \frac{\text{Total distance}}{\text{Total time}}$$

$$\text{average speed} = \frac{140}{18} = 7 \frac{14}{18} =$$

$$7 \frac{7}{9} \text{ km/h}$$

116. (a) We use formula directly D

$$= \frac{xy}{x-y} (t_2 - t_1)$$

where $x \rightarrow$ Normal/Initial speed

$y \rightarrow$ increased/decreased speed

assume speed of the bus

= S km/h

$$(i) \quad \frac{S \times (S + 7)}{7} \times 1 = \frac{S \times (S - 5)}{5} \times 1$$

[Distance in both cases should be equal]

$$5S + 35 = 7S - 35$$

$$2S = 70 \Rightarrow S = 35 \text{ km/h}$$

$$(ii) \quad \text{Distance} = \frac{35 \times 42}{(42 - 35)} \times 1 = \frac{35 \times 42}{7} = 210 \text{ km}$$

$$(iii) \quad \text{actual time} = \frac{\text{distance}}{\text{speed}} = \frac{210}{35} = 6 \text{ hours}$$

117. (a) **Note :-** We use above formula directly :

$$\text{Distance} = \frac{xy}{x-y} (t_2 - t_1)$$

Let initial speed = S km/h

Now from formula :

$$\frac{S(S+2)}{2} \times \frac{60}{60} = \frac{S(S-1)}{1} \times \frac{40}{60}$$

$$\Rightarrow 3S + 6 = 4S - 4$$

$$S = 10 \text{ km/h}$$

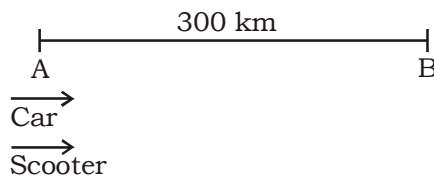
Initial speed = 10 km/h

By using formula, D

$$= \frac{10 \times 12}{2} \times \frac{60}{60} = 60 \text{ km}$$

118. (a) Let the speed of car = x km/h

Let the speed of Scooter = y km/h



from question : Time taken by car to reach from A to B :

Condition (i):-

$$T_1 = \left(\frac{300 \times 2}{3x} + \frac{10}{60} + \frac{300 \times 1 \times 4}{3 \times x \times 3} \right) = \left(\frac{200}{x} + \frac{1}{6} + \frac{400}{3x} \right)$$

$$T_1 = \left(\frac{1000}{3x} + \frac{1}{6} \right) \text{ hours}$$

Condition (ii):-

Time taken by scooter to reach from A to B.

$$(T_2) = \left(\frac{300}{3 \times y} + \frac{1}{2} + \frac{300 \times 2}{3 \times y \times 2} \right)$$

$$= \left(\frac{100}{y} + \frac{1}{2} + \frac{100}{y} \right)$$

$$T_2 = \left(\frac{200}{y} + \frac{1}{2} \right) \text{ hours}$$

from question $T_1 = T_2$

$$\frac{1000}{3x} + \frac{1}{6} = \frac{200}{y} + \frac{1}{2}$$

$$1000y - 600x = xy \dots (i)$$

$$x = y + 15 \dots (ii) \text{ (given)}$$

now after solving equation (i) & (ii)

$$y = 25 \text{ km/h, } x = 40 \text{ km/h}$$

Time taken from A to B

$$= \frac{200}{25} + \frac{1}{2} = \left(8 + \frac{1}{2} \right)$$

$$= \left(8 + \frac{1}{2} \right) \text{ hours}$$

$$\text{it means} = (7 \text{ am} + 8 \frac{1}{2}) \text{ hours}$$

$$= 3:30 \text{ pm}$$

119. (a) Let the car travels x km at the speed of 40 km/h and y km at a speed of 60 km/h.

according to the question,

Condition (i):-

$$\frac{x}{40} + \frac{y}{60} = 14 \dots (i)$$

Condition (ii):-

$$\frac{x}{45} + \frac{y}{75} = 12 \dots (ii)$$

after solving equation (i) & equation (ii) $x = 360 \text{ km}$

$$y = 300 \text{ km}$$

$$(i) \quad \text{Total distance travelled by car} = x + y = (360 + 300) = 660 \text{ km}$$

$$(ii) \quad \text{Speed} = \frac{d}{t} = \frac{660}{14} = \frac{330}{7}$$

$$= 47 \frac{1}{7} \text{ km/h}$$

120. (a) Speed of Rakesh Yadav for first-one third = 10 km/h
Speed of Rakesh Yadav for next-one third = 6 km/h
Speed of Rakesh Yadav for next-

$$\text{one third} = \frac{15}{2} \text{ km/h}$$

From question → **condition (i)**

Note:- In such questions assume a distance LCM of speeds.

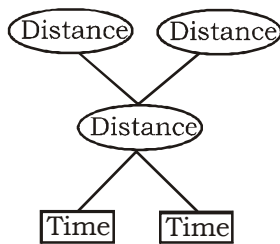
$$\begin{array}{l} 10 \text{ km/h} \xrightarrow{3} \\ 6 \text{ km/h} \xrightarrow{5} \\ 15/2 \text{ km/h} \xrightarrow{4} \end{array} \rightarrow 30 \text{ km} \quad \begin{array}{l} \text{Total time} \\ = 3+5+4 \\ = 12 \text{ hours} \end{array}$$

Condition (ii):-

$$\begin{array}{l} 9 \text{ km/h} \xrightarrow{5h} \\ 5 \text{ km/h} \xrightarrow{9h} \end{array} \rightarrow 45 \text{ km}$$

Total time = (5 + 9) = 14 hours
Difference in time = (14 - 12) = 2 h
from question it is also two hours.
Then 1/3rd distance = 30 km
Total distance = 3 × 30 = 90 km
Total journey = 90 km

- 121 (a) **Note:-**



In such question use alligation to make it easier.

Let assume if he travelled whole journey on foot then

distance travelled in 13 hours = 13 × 5 = 65 km

similarly by cycle = 13 × 7 = 91 km

$$\begin{array}{cc} \text{Foot} & \text{Cycle} \\ 65 & 91 \\ \hline 12 & 14 \\ 6 & 7 \end{array}$$

$$\frac{T_1}{T_2} = \frac{6}{7} \rightarrow \text{foot} \rightarrow \text{cycle}$$

Distance travelled by cycle = 7 × 7 = 49 km

- 122 (a) Let the speed of the car = x km/h
Let the speed of the train = y km/h

Condition (i):-

$$\frac{250}{x} + \frac{550}{y} = 27 \quad \dots(i)$$

Condition (ii):-

$$\frac{300}{x} + \frac{500}{y} = 26 \quad \dots(ii)$$

Note:- Take help from options,

put x = 50 km/h

and y = 25 km/h

Speed of the car = 50 km/h

Speed of the train = 25 km/h

123. (a) Let the speed of the car = x km/h

From question →

Condition (i):-

$$\frac{20}{5} + \frac{45}{x} = T_1 \quad \dots(i)$$

Condition (ii):-

$$\frac{27}{x} + \frac{38}{5} = T_2 \quad \dots(ii)$$

From question $T_2 - T_1 = (1 \text{ hour } 36 \text{ min})$

$$= \left(1 + \frac{36}{60}\right) = \frac{8}{5} \text{ hours}$$

$$\frac{27}{x} + \frac{38}{5} - \frac{20}{5} - \frac{45}{x} = \frac{8}{5}$$

$$\frac{27}{x} + \frac{18}{5} - \frac{45}{x} = \frac{8}{5}$$

$$\Rightarrow -\frac{18}{x} = -\frac{10}{5} \Rightarrow x = 9 \text{ km/h}$$

Then the speed of the car = 9 km/h

- 124 (a) Let initial speed of bus = x km/h
Distance = 700 km, new speed = (x - 20) km/h

From question,

$$\frac{700}{(x-20)} - \frac{700}{x} = 4$$

Now use options to solve this equation.

x = 70 km/h

125. (a) **Note:-** In such questions always remember this formula =:

$$\text{Distance} = \frac{xy}{x-y} \times (t_2 - t_1)$$

Where → x → first speed, y

= speed at second time

T_2 and T_1 refers the initial and the later time.

From question, x = 10 km/h, y = 15 km/h

$$(t_2 - t_1) = \left(5 + \frac{5}{2}\right) = \frac{15}{2} \text{ min}$$

$$= \frac{15}{2 \times 60} \text{ h} = \frac{1}{8} \text{ hour}$$

Now put all values in above formula

$$(i) \text{ Distance} = \frac{10 \times 15}{(15 - 10)} \times \frac{1}{8}$$

$$= \frac{10 \times 3}{8} = \frac{15}{4} = 3 \frac{3}{4} \text{ km}$$

$$(ii) t = \frac{15}{4 \times 10} \times 60 = 22.5 \text{ min}$$

correct time to reach = (22.5 - 5) = 17.5 min

$$\text{Speed} = \frac{15 \times 60 \times 10}{4 \times 17.5} = 12 \frac{6}{7} \text{ km/h}$$

126. (a) See the formula mention in previous question and also see the terms mention there.

x = 60 km/h, y = 80 km/h

$(t_2 - t_1) = (6 + 4) = 10 \text{ min}$

$$= \frac{10}{60} = \frac{1}{6} \text{ hour}$$

$$(i) (D) \text{ Distance} = \frac{xy}{x-y} \times (t_2 - t_1)$$

$$D = \frac{60 \times 80}{20} \times \frac{1}{6} \Rightarrow D = 40 \text{ km}$$

$$(ii) \text{ Time to reach city} = \frac{D}{V}$$

$$= \frac{40}{60} \times 60 = 40 \text{ mins}$$

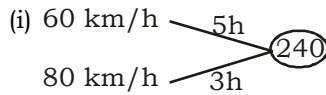
But he was late 6 minutes then actual time = (40 - 6) = 34 mins

(iii) Speed to reach the city on

$$\text{time} = \frac{D}{t} = \frac{40}{34} \times 60$$

$$S = \frac{40}{34} \times 60 = \frac{1200}{17}$$

$$= 70 \frac{10}{17} \text{ km/h}$$

Alternative:-

Difference(Time)

Distance $4\text{ h} - 3\text{ h} = 1\text{ h}$

240 km

When time difference is 1 hour
then distance = 240 km

It means 60 minutes time difference = 240 km

$$1\text{ min} \longrightarrow \frac{240}{60}\text{ km}$$

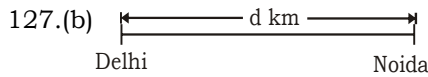
$$10\text{ min} \longrightarrow \frac{240}{60} \times 10$$

$$= 40\text{ km}$$

From question,

difference in time = $(6 + 4) = 10\text{ min}$ $D = 40\text{ km}$

Note :- We can find the distance in this way but other data will be found by the same process as mentioned in above question.

Let the distance between Delhi and Noida is $d\text{ km}$.Let the speed of two joggers is S_1 and S_2 respectively.

from question,

Condition (I):-

$$S_1 = \frac{(d-1)}{42} \quad \dots(i)$$

$$S_2 = \frac{(d-2)}{52} \quad \dots(ii)$$

Condition (II):-

$$\frac{(d-1)}{(d-2)} \times 52 - \frac{(d-2)}{(d-1)} \times 42 = 17$$

Now take help from options put $d = 15$

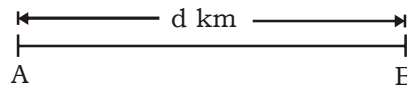
$$\frac{14 \times 52}{13} - \frac{13 \times 42}{14} = 17$$

$$56 - 39 = 17$$

$$17 = 17$$

both sides are equal so we can say $d = 15\text{ km}$

128. (c)

Cyclist A $\rightarrow x\text{ km/h}$ Cyclist B $\rightarrow y\text{ km/h}$

Let the distance between A and B is $d\text{ km}$, and the speed of two cyclists A and B is $x\text{ km/h}$ and $y\text{ km/h}$ respectively. Let the cyclist A travels for t hours to reach B then cyclist B travels $(t-2)$ hours to reach B.

From question,

Condition (I):-

$$tx = (t-2)y = d$$

$$\frac{x}{y} = \frac{t-2}{t} \quad \dots(i)$$

Condition (II):-

When they move in opposite direction

$$\frac{4}{3}(x+y) = d$$

$$4(x+y) = 3d \quad \dots(ii)$$

Now from equation (I) & (II)

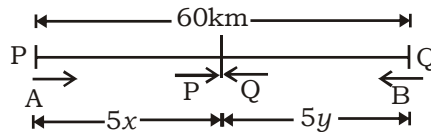
$$4(t-2+t) = 3t(t-2)$$

after solving $t = 4\text{ hours}$ Speed of cyclist A (x) = 2 km/h Speed of cyclist B (y) = 4 km/h Total distance = $tx = 4 \times 2 = 8\text{ km}$

Time taken by faster cyclist to travel

$$= \frac{8}{4} = 2\text{ hours}$$

129. (c)



Let two persons P and Q are from A and B respectively, and let their speeds are $x\text{ km/h}$ and $y\text{ km/h}$ and respectively.

Condition (I):-

They are moving in opposite direction then, relative speed

$$= (x+y)\text{ km/h}$$

$$5 = \frac{60}{(x+y)} \Rightarrow x+y = 12 \quad \dots(i)$$

Condition (II):-New speed of P = $(x-1.5)\text{ km/h}$ New speed of Q = $(y+1.5)\text{ km/h}$

Note:- First person (P) is arriving first so we can say P is faster than Q then we neglect option (a) and option (b).

From question

$$\Rightarrow \frac{5x}{y+1.5} - \frac{5y}{x-1.5} = 2.5 \quad \dots(ii)$$

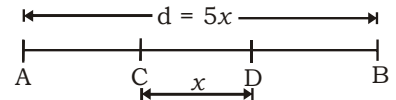
Now help from option - Let speed of P = 7.5 km/h then speed of Q = 4.5 km/h put in equation (ii) $x = 7.5\text{ km/h}$ and $y = 4.5\text{ km/h}$

$$\frac{5 \times 7.5}{6} - \frac{5 \times 4.5}{6}$$

$$\Rightarrow \frac{25}{4} - \frac{15}{4} = \frac{10}{4} = 2.5$$

These values satisfy the equation so speed of first person (P) = 7.5 km/h

130. (d)

Let the original distance between A and B is $5x\text{ km}$.

Note:- In this question to save your time take help from options.

From option: Let the faster walker takes 4 hours then from question slowest walker will take

$$= 8 + 4 = 12\text{ hours}$$

$$\text{Then speed of fastest walker} = \frac{5x}{4}$$

$$\text{Speed of slowest walker} = \frac{5x}{12}$$

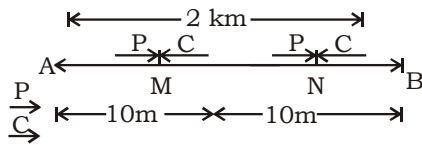
from question condition,

$$\frac{144}{60} = \frac{d}{\frac{5x}{4} + \frac{5x}{12}} \Rightarrow d = 4x$$

Remaining distance = $5x - 4x = x\text{ km}$

This is the 20% of the total distance So we can say option (d) is correct because it satisfies all the conditions of the question

131. (b)



Let P represents the pedestrian and the C represents the cyclist.

Let assume the distance between A and B is 2 km.

From question :

Condition (i):-

Time distance covered by P and C
1 hr 4 km

Condition (ii):

30min 2 km

Note : So we can say M is the mid-points of AB. now-

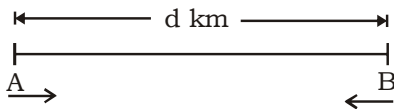
Pedestrian : Cyclist

Distance → 1 : 3(speed)
covered

Time taken by P to cover whole journey from A to B ⇒ t

$$= \frac{2}{1} \Rightarrow t = 2 \text{ hours}$$

132 (c)



Let the distance between two points A and B is d km.

Note :- We are not changing the speeds of the persons so the ratio of distance covered in both the cases would be same.

Now from question,

$$\frac{\frac{2}{3}d}{\frac{d}{2}-3} = \frac{\frac{d}{2}-2}{\frac{d}{4}} \Rightarrow \frac{\frac{2}{3}d}{\frac{d-6}{2}} = \frac{d-4}{\frac{d}{4}}$$

$$\frac{4d}{3d-18} = \frac{2d-8}{d} \Rightarrow 4d^2$$

$$= 6d^2 - 36d - 24d + 144$$

$$2d^2 - 60d + 144 = 0$$

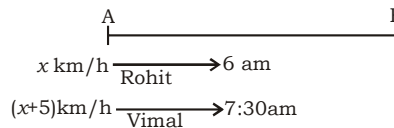
$$d^2 - 30d + 72 = 0$$

after solving the equation

$$d = 15 \pm 3\sqrt{17}$$

$$d = 15 - 3\sqrt{17}$$

133. (d)



Let the speed of Rohit is x km/h then speed of Vimal is (x + 5) km/h

Note:- From question : Vimal could either be 21 km behind Rohit or 21 km ahead of Rohit.

Condition (i):-

When Rohit is 21 km ahead till 10 : 30 pm of the same day.

$$x \times \frac{33}{2} - (x + 5)15 = 21$$

$$\frac{33}{2}x - 15x - 75 = 21$$

$$\frac{3x}{2} = 96 \Rightarrow x = 64 \text{ km/h}$$

Speed of Vimal
= 64 + 5 = 69 km/h

Condition (ii):-

When Vimal is 21 km ahead till 10 : 30 pm of the same day.

$$(x + 5)15 - \frac{33}{2}x = 21$$

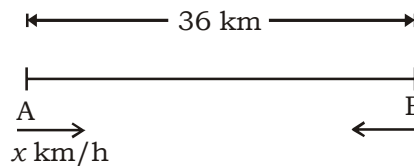
$$15x + 75 - \frac{33x}{2} = 21$$

$$\frac{-3x}{2} = -54 \Rightarrow x = 36 \text{ km/h}$$

Speed of Vimal
= 36 + 5 = 41 km/h

Hence option (d) either b or c is correct.

134. (c)



Let the speed of the car is x km/h

Now according to question,

$$\frac{36}{(x+6)} + \frac{36}{(x-6)} = 8$$

$$\left(\frac{x+6+x-6}{x^2-36} \right) = \frac{8}{36} \Rightarrow \frac{2x}{x^2-36} = \frac{2}{9}$$

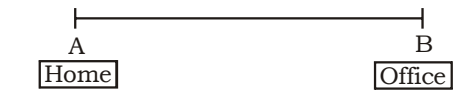
$$x^2 - 9x - 36 = 0$$

after solving $x = 12 \text{ km/h}$

Time taken by car at faster speed

$$= \frac{36}{(12+6)} = 2 \text{ hours}$$

135 (a)



Rakesh yadav

From question,
Condition (I)

Actual	Speed	Time
→ 5	5	4
→ 4	4	5

1 unit → 15 min

Actual time 4 units → 4 × 15
= 60 min

Condition (II):-

Speed	Time
4	5
	× 12 min

from actual time 60 min

Therefore, he will be 15 + 12 = 27 minutes early in comparison to the previous day.

136. (a) According to the question,

I st	II nd	III rd
Hour	Hour	Hour
speed → x	3x	2x

Condition (i):-

When the car travels at the IInd hour speed during all the three hours then total distance = 3x × 3 = 9x

Condition (ii) :

Total distance covered when car travels at different speeds at each hour.

$$= x + 3x + 2x = 6x$$

Now we conclude:-

Speed : Time

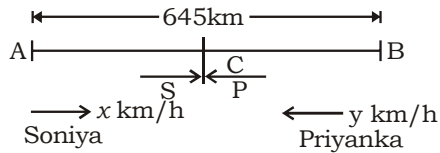
Actual 9x : 6x

New 6x : 9x

Reduction in time

$$= \frac{(9x-6x)}{9x} \times 100 = 33 \frac{1}{3} \%$$

137 (d)



Let the speed of Soniya and Priyanka is x km/h and y km/h respectively. And C is a point where both Priyanka and Soniya meet.

From question :**Condition (i):-**

When they are moving in opposite direction $15(x + y) = 645$

$$x + y = 43 \quad \dots (i)$$

Condition (ii):-

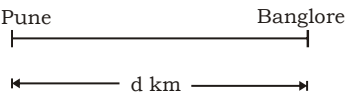
Note:- They are actually exchanging their speeds. So they can arrive at the same time at their respective destinations, it means the difference in speeds is 3 km/h.

$$y - x = 3 \quad \dots (ii)$$

from (i) & (ii)

$$x = 20 \text{ km/h}, y = 23 \text{ km/h}$$

138. (c)



Let the distance between Pune and Bangalore is d km, and let the speed of horse rider is S km/h.

From question:-

Condition (i):-

$$\frac{d}{S} - \frac{d}{S+6} = 4 \quad \dots (i)$$

Condition (ii):-

$$\frac{d}{(S-6)} - \frac{d}{(S+6)} = 10 \quad \dots (ii)$$

from both the equations distance (d) would be equal then :

$$\frac{4S(S+6)}{6} = \frac{10(S+6)(S-6)}{12}$$

after solving $S = 30$ km/hr

Distance

$$\begin{aligned} &= \frac{4S(S+6)}{6} \\ &= \frac{4 \times 30 \times 36}{6} = 720 \text{ km} \end{aligned}$$

Alternate:- In earlier examples we have explained the formula:

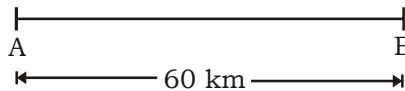
$$\text{Distance} = \frac{xy}{x-y}(t_2 - t_1), \text{ we can}$$

also take help from this formula in such type of question.

$$\begin{aligned} &= \frac{S(S+6)}{6} \times 4 \\ &= \frac{(S+6)(S-6)}{12} \times 10 \end{aligned}$$

Now solve as above.

139. (a)



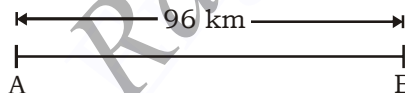
Let the initial speed of the man = x km/h

$$\text{from question : } \frac{60}{x} - \frac{60}{x+1} = \frac{6}{60}$$

Take help from options then $x = 24$ km/h

Newly speed (Increased speed) = $24 + 1 = 25$ km/h

140. (a)



from question : Rakesh Yadav covered the distance 1 km more in 60 minutes which he initially covered in 75 minutes.

$$\% \text{ increased speed} = \frac{15}{60} \times 100 = 25\%$$

Now take help from option,

assumed speed = 16 km/h

Time required for travelling 96

$$\text{km} = \frac{96}{16} = 6 \text{ hours}$$

This speed is 25% more then, original speed

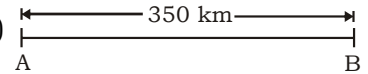
$$= 16 \times \frac{3}{4} = 12 \text{ km/h}$$

$$\text{Now required time} = \frac{96}{12} = 8 \text{ hours}$$

$$\begin{aligned} \text{Difference in time} &= (8 - 6) \\ &= 2 \text{ hours} \end{aligned}$$

Note:- Difference of 2 hours also mentioned in question so option (a) is correct.

141. (c)



$$x - y = 5$$

$$(t_2 - t_1) = \left(2 + \frac{1}{3}\right) \text{ hours} = \frac{7}{3}$$

hours

Note:- In such type of question use this formula. We earlier explained all the terms regarding this formula.

$$D = \frac{xy}{x-y}(t_2 - t_1)$$

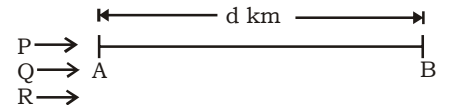
$$350 = \frac{x(x+5)}{5} \left(\frac{7}{3}\right)$$

$$x(x+5) = \frac{750}{3} = 250$$

Make two factors of 750 which has the difference of 5 or take help from options.

So speed (slower) = 25 km/h

142. (b)



Let the distance between A and B is d km and the three cars P, Q and R are moving from A to B.

Let the speed of the car P

$$= x \text{ km/hr}$$

Then, the speed of the car Q

$$= (x + 10) \text{ km/h}$$

Let the time taken by car P in travelling from A to B is t hours.

Time taken by car Q from A to B = $(t - 1)$ hours

We know,

$$\text{distance} = \text{time} \times \text{speed}$$

$$(x + 10)(t - 1) = xt$$

$$tx + 10t - x - 10 = xt$$

$$10t - x = 10 \quad \dots (i)$$

From question : (Condition for IIIrd car R)-

$$\text{Time} = 33.33 \text{ mins} = 33 + \frac{1}{3}$$

$$= \frac{100}{3} \text{ min} = \frac{5}{9} \text{ hours}$$

Required time for car R

$$= \left(t - \frac{5}{9}\right) \text{ hours}$$

$$\frac{1}{2} \left(t - \frac{5}{9}\right) x + \frac{1}{2} \left(t - \frac{5}{9}\right) (x+10) = tx$$

Note:- distance would be equal in each case.

$$\frac{1}{2} \left[tx - \frac{5}{9}x + tx - \frac{5}{9}x + 10t - \frac{50}{9} \right] = tx$$

$$10t - \frac{10x}{9} = \frac{50}{9} \quad \dots (ii)$$

from equations (i) and (ii)

$$x = 40 \text{ km/h and } t = 5 \text{ hours}$$

$$\text{Distance} = tx = 40 \times 5 = 200 \text{ km}$$

$$\text{for three cars distance covered} = 200 \times 3 = 600 \text{ km.}$$

143. (a) Let the total distance = $4d$ km

According to the question,

$$\frac{3d}{12} + \frac{d}{16} = 5 \Rightarrow \frac{12d+3d}{48} = 5$$

$$d = 16$$

$$\text{Total distance} = 4d = 4 \times 16$$

$$= \mathbf{64 \text{ km}}$$

144. (c) Let the speed of the car is x km/h

It is clear from question that the car travels 600m in 20 seconds. then speed of the car(x)

$$= \frac{600}{20} \times \frac{18}{5} = 108 \text{ km/h}$$

145. (a) Distance covered by thief in

$$\frac{1}{2} \text{ hour} = \frac{1}{2} \times 40 = 20 \text{ km}$$

According to the question,

Now thief and the police are moving in the same direction.

$$\therefore \text{Relative speed} = (50-40) = 10 \text{ km/hr}$$

$$\text{Required time} = \frac{20}{10} = 2 \text{ hours}$$

The police will overtake the thief after 2 hours.

Alternate:-

Required time

$$= \frac{40}{(50-40)} \times \frac{1}{2} = 2 \text{ hours}$$

Note:- Required time

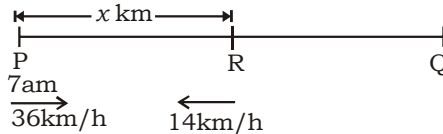
$$= \frac{x}{(y-x)} \times t$$

Where, x = speed of thief, y

= speed of police

t = time gap

146. (d)



Let the distance between P and R is x km.

R is a point where the bike went out of order.

from question,

$$\text{total time} = \frac{x}{36} + \frac{35}{60} + \frac{x}{14}$$

$$6 - \frac{7}{12} = \frac{7x+18x}{36 \times 7}$$

$$\Rightarrow \frac{25x}{36 \times 7} = \frac{65}{12}$$

$$x = \frac{36 \times 7 \times 65}{12 \times 25}$$

$$\Rightarrow x = 54.6 \text{ km}$$

147. (a) **Note:-** In such type of questions always use below mentioned formula.

Time in stoppage per hour

$$= \frac{\text{Difference in speed}}{\text{Speed without stoppage}}$$

Time in stoppage per hour

$$= \frac{(50-40)}{50} = \frac{1}{5} \text{ hour}$$

$$= \frac{1}{5} \times 60 = 12 \text{ mins}$$

148. (d) Let the speed of the bus = S

Let the time taken by the bus = T and

distance = d

from question,

$$S \propto \frac{d}{\sqrt{T}} \Rightarrow S = \frac{kd}{\sqrt{T}} \dots (i)$$

From condition (i), $S = 40 \text{ km/h}$, $d = 60 \text{ km}$,

$T = 4 \text{ hours}$, put values in equation (i)

$$40 = \frac{k \times 60}{\sqrt{4}}$$

$$\Rightarrow k = \frac{40 \times 2}{60} \Rightarrow k = 4/3$$

from condition (ii) $S = 44 \text{ km/h}$,

$d = ?$, $t = 9 \text{ hours}$, $k = 4/3$

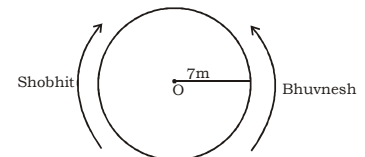
put values in equation (i)

$$44 = \frac{4 \times d}{3 \times \sqrt{9}}$$

$$\Rightarrow d = \frac{44 \times 3 \times 3}{4} = 99$$

$$d = 99 \text{ km}$$

149. (d) **Note:-** When they will meet they have together covered distance equal to circumference of circle.



$$\text{Circumference} = 2 \pi r$$

$$= 2 \times \frac{22}{7} \times 7 = 44 \text{ m}$$

Distance covered in 5th meeting = $44 \times 5 = 220 \text{ m}$

Ratio of speed = Distance covered by Shobhit : Distance covered by Bhuvnesh

$$= 140 : (220 - 140)$$

$$S_1 : S_2 = 140 : 80$$

$$S_1 : S_2 = 7 : 4$$

150. (a)

$\rightarrow$ car x km/h

$\rightarrow$ Bus y km/h

Let the speed of the car and the bus is x km/h and y km/h respectively.

Condition (i):-

Time taken by the bus to reach from A to B

$$T_1 = \left(\frac{500}{y} + \frac{1}{3} + \frac{250 \times 5}{4y} \right)$$

$$= \left(\frac{1000}{2y} + \frac{1}{3} + \frac{625}{2y} \right)$$

Condition (ii):-

Time taken by car to reach from A to B

$$T_2 = \left(\frac{250}{x} + \frac{2}{3} + \frac{500 \times 6}{5x} \right)$$

$$= \left(\frac{250}{x} + \frac{2}{3} + \frac{3000}{5x} \right) \text{ hours}$$

from question, $T_1 - T_2 = \frac{19}{18}$ hours

$$\left(\frac{1625}{2y} + \frac{1}{3} \right) - \left(\frac{850}{x} + \frac{2}{3} \right) = \frac{19}{18} \dots (i)$$

from question : $x - y = 15 \dots (ii)$

Note : Now use options $\rightarrow$ put $x = 90$ km/h, $y = 75$ km/h

- (i) Speed of the car = 90 km/h
Speed of the bus = 75 km/h
(ii) Time taken by bus to reach B.

$$T_2 = \frac{1625}{150} + \frac{1}{3} = \frac{67}{6}$$

$$= 11 \text{ h } 10 \text{ min.}$$

If bus starts at 10 am then it will reach B after 11 hours 10 min. It means it will reach at 9 : 10 pm

151. (a) Speeds of A, B and C respectively = 3, 4, 5 km/h (given)

A $\rightarrow$ 3 km/h starts moving 7 am

B $\rightarrow$ 4 km/h starts moving 8 am

C $\rightarrow$ 5 km/h starts moving 9 am

From question:-

when B meets A- In this case A also travelled 3 km till 8 am because he started 1 hour earlier. Time taken by the man B to catch A

$$= \frac{\text{Distance}}{\text{Relative Speed}}$$

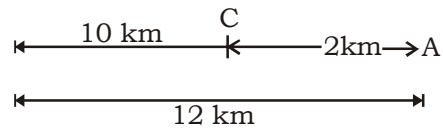
$$= \frac{3}{(4-3)} = 3 \text{ hours}$$

it means B will catch A at 11 'o'clock.

$\Rightarrow$ We know C already starts at 9 'o'clock and till 11 'o'clock it covered the distance

$$= T \times V = 5 \times 2 = 10 \text{ km}$$

Distance covered by A
 $= 4 \times 3 = 12 \text{ km}$



Distance between C and A = 2 km
Relative speed [Because Now C, and A are moving in opposite direction] = $5 + 3 = 8$ km/h

Time taken to meet A and C

$$= \frac{2}{8} \text{ hrs} = \frac{2}{8} \times 60 \text{ min} = 15 \text{ min}$$

So, we can say C will receive the message at

11 : 15 'o' clock.

(ii) Distance travelled by C

$$= T \times V = \left(2 + \frac{1}{4} \right) \times 5$$

$$= \frac{45}{4} \text{ km} \Rightarrow D = 11 \frac{1}{4} \text{ km}$$

152. (a) Speed of A, B and C respectively is 6 km/h, 8 km/h and 10 km/h.

They all start at 2 pm, 4pm, 6pm respectively.

From condition (i):-

when B meets A - Time taken by B to catch A

$$= \frac{12}{2} = 6 \text{ hours}$$

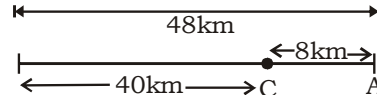
it means B will catch A at 10 pm.

Till 10 pm distance covered by

$$C = 4 \times 10 = 40 \text{ km}$$

Till 10 pm distance covered by

$$A = 8 \times 6 = 48 \text{ km}$$

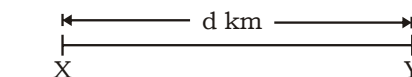


Time taken to meet A and C

$$= \frac{8}{16} \text{ hour} = \frac{1}{2} \times 60 = 30 \text{ min.}$$

so we can say C will receive the message at 10:30 p.m.

153. (a)



x km/h $\rightarrow$ Bus

y km/h $\rightarrow$ Car

Let the speed of bus and the car is x km/h and y km/h respectively, and the distance between X and Y is d km.

From question:**Condition (i):-**

Let Bus moves t hours then car will move $(t - 2)$ hours.

$$tx = (t - 2)y = d$$

$$\frac{x}{y} = \frac{(t-2)}{(t)} \dots (i)$$

Condition (ii):-

When they move in opposite direction,

$$(x + y) \left(1 + \frac{1}{3} \right) = d \dots (ii)$$

After solving equation (i) & (ii)

$$t = 4 \text{ hours}$$

Then speed of Bus = $(4 - 2)$

$$= 2 \text{ km/h}$$

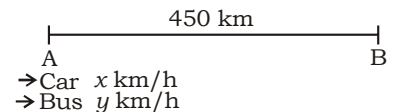
Speed of car = 4 km/h

Total distance = $tx = 4 \times 2 = 8 \text{ km}$

Time taken by car

$$= 8/4 = 2 \text{ hours.}$$

154. (a)



Let the speed of the car

$$= x \text{ km/h}$$

Let the speed the bus

$$= y \text{ km/h}$$

from question $\rightarrow x - y = 20 \dots (i)$

from question $\rightarrow$ condition

(i) : Time taken by car to reach from A to B.

$$T_1 = \left(\frac{300 \times 2}{x} + 2 + \frac{150 \times 3}{2x} \right)$$

$$= \left(\frac{600}{2x} + 2 + \frac{450}{x} \right)$$

$$= \left(\frac{1050}{2x} + 2 \right) \text{ hours}$$

Condition (ii):

Time taken by bus to reach from A to B :

$$T_2 = \left(\frac{150 \times 5}{y} + 1 + \frac{300}{5y} \times 4 \right)$$

$$= \left(\frac{750}{y} + \frac{120}{5y} + 1 \right) \text{ hours}$$

from question, $T_1 = T_2$

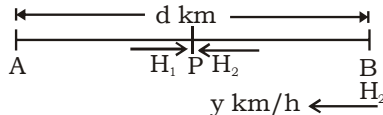
$$\left(\frac{1050}{2x} + 2\right) = \left(\frac{1950}{5y} + 1\right) \quad \dots (ii)$$

use options to solve equation (i) & (ii), $x = 60$ km/h, $y = 40$ km/h

- (i) Speed of the car = 60 km/h
(ii) Speed of the bus = 40 km/h
(iii) Time taken in whole journey

$$= \left(\frac{1050}{2 \times 60} + 2\right) \text{ hours} = 10 \text{ hrs } 45 \text{ min}$$

155. (a)



Let the distance between A and B is d km, and the speed of two horses H_1 and H_2 is x km/h and y km/h respectively, and P is a point where two horses meet.

from question:

Condition (I):-

$$\left(3 + \frac{1}{3}\right)(x + y) = d$$

$$10(x + y) = 3d \quad \dots (i)$$

Condition (II):-

Horse (H_1) reaches the destination 5 hours later than the H_2 .

$$(t + 5)x = ty = d$$

$$\frac{x}{y} = \frac{t}{t+5}$$

put values in equation (i)

$$10(t + t + 5) = 3[t(t + 5)]$$

$$20t + 50 = 3t^2 + 15t$$

$$3t^2 - 5t - 50 = 0$$

after solving $t = 5$ hours

then speed of Horse $H_1 = 5$ km/h

Speed of Horse $H_2 = 10$ km/h

Total distance between A and B

$$= ty = 10 \times 5 = 50 \text{ km}$$

Time taken by slower horse to

$$\text{cover the distance} = \frac{50}{5} = 10 \text{ hours.}$$

Alternate:-

Hit and Trial Method.

Let the distance between A and B is 100%

$$\frac{10}{3}(x + y) = 100 \Rightarrow (x + y) = 30\%$$

....(i)

Now take help from options,

Let slower rider takes 10 hours

$$\text{then \% distance covered} = \frac{100}{10}$$

$$= 10\%$$

from equation (i) other covers 20% it means it travels or rides for 5 hours. Then check the time difference matches with question or not. If match then option is correct.

156. (c) Relative speed of the man and train

$$= 20 - 10 = 10 \text{ m/sec.}$$

$$\therefore \text{Required time} = \frac{180}{10} = 18 \text{ sec.}$$

157. (c) In this situation, the train covers the distance equals to its length.

$$\therefore \text{Required time} = \frac{100 \text{ m}}{30 \times \frac{5}{18} \text{ m/s}}$$

$$= \frac{100 \times 18}{30 \times 5} = 12 \text{ sec}$$

158. (b) Relative speed = $63 - 3$

$$= 60 \text{ km/hr}$$

$$\therefore \text{Required time} = \frac{500 \times 18}{60 \times 5} = 30 \text{ sec}$$

159. (c) Let the length of train be L metres.

$$\text{Speed} = 90 \text{ km/hr.}$$

$$= 90 \times \frac{5}{18} \text{ m/s} = 25 \text{ m/s}$$

$$\therefore \text{distance covered in 60 sec.}$$

$$= 25 \times 60$$

$$= 1500 \text{ metres}$$

Now, according to the question,

$$2L = 1500$$

$$\Rightarrow L = 750 \text{ metres}$$

160. (d) Train passes the man in 10 sec.

& it passes the platform in 14 sec.

Note :- when train passes the man, it covers the distance which is equal to its length.

i.e., train covers 50 m i.e. length of platform in $14 - 10 = 4$ sec.

$$\therefore \text{Speed of the train} = \frac{50}{4} \text{ m/sec}$$

$$= \frac{25}{2} \times \frac{18}{5} \text{ km/hr} = 45 \text{ km/hr}$$

161. (b)

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{125}{30} = \frac{25}{6} \text{ m/s}$$

$$= \frac{25}{6} \times \frac{18}{5} \text{ km/hr.} = 15 \text{ km/hr.}$$

162. (c) According to the question,

It is clear that train will cover $(800 - 400)\text{m.} = 400 \text{ m}$ in $(100 - 60)\text{seconds} = 40 \text{ sec.}$

$\therefore$ in 100 sec. train will cover

$$= \frac{400}{40} \times 100 = 1000 \text{ m}$$

& length of the bridge = 800 m

$$\therefore \text{length of the train} = 1000 - 800 = 200 \text{ m}$$

163. (b) Clearly, train will cover 264 metres i.e. length of platform in $20 - 8 = 12 \text{ sec.}$

$$\text{i.e. speed of the train} = \frac{264}{12}$$

$$= 22 \text{ m/s}$$

$\therefore$ train passes a man in 8 sec.

$$\therefore \text{length of the train} = 22 \times 8 = 176 \text{ metre.}$$

164. (c) Required time

$$= \frac{75 \text{ m}}{20 \text{ km/hr}} = \frac{75 \text{ m}}{20 \times \frac{5}{18} \text{ m/s}}$$

$$= \frac{75 \times 18}{20 \times 5} = 13.5 \text{ seconds}$$

165. (c) Speed of the train

$$= \frac{\text{train} + \text{bridge}}{\text{Time taken}}$$

$$= \frac{150 + 500}{30} = \frac{650}{30} = \frac{65}{3} \text{ m/s}$$

$\therefore$ Required time

$$= \left(\frac{150 + 370}{65}\right) \times 3 = 24 \text{ seconds}$$

Alternatively:-

clearly, train covers $150 + 500$
 $= 650$ metres in 30 seconds

$\therefore$ To cover $150 + 370 = 520$
 metres in 24 seconds

166.(c) In crossing the bridge,
 total distance travelled by the
 train $= 300 + 200 = 500$ m

$\therefore$ Required time

$$= \frac{500}{25} = 20 \text{ seconds}$$

167.(b) Speed $= 78 \text{ km/hr} = 78$

$$\times \frac{5}{18} \text{ m/s} = \frac{65}{3} \text{ m/s}$$

$\therefore$ in 1 min or 60 sec, distance
 travelled

$$= \frac{65}{3} \times 60 = 1300 \text{ m}$$

This total distance 1300 m will
 be equal to the (length of train
 + length of tunnel)

$$\therefore \text{length of tunnel} \\ = 1300 - 800 = 500 \text{ m}$$

168.(c) Let the speed of each train
 be $x \text{ km/hr}$.

$\therefore$ Their relative speed $= x + x =$
 $2x \text{ km/hr}$

$$\text{Time taken} = \frac{\text{Total length of trains}}{\text{Relative speed}}$$

$$\Rightarrow \frac{12}{60 \times 60}$$

$$= \frac{240 \times \frac{1}{1000} \text{ km}}{2x}$$

$$\left[\begin{array}{l} t = 12 \text{ sec} \\ t = \frac{12}{60 \times 60} \text{ hrs} \end{array} \right]$$

$$\Rightarrow \frac{1}{300} = \frac{120}{1000x}$$

$$\Rightarrow x = 36 \text{ km/hr.}$$

i.e. the required speed $= 36 \text{ km/hr}$

169.(a) Clearly, train travels 84 m
 i.e. length of platform in
 $21 - 9 = 12$ sec.

$$\therefore \text{speed of the train} = \frac{84}{12}$$

$$= 7 \text{ m/sec}$$

$$= 7 \times \frac{18}{5} \text{ km/hr.} = 25.2 \text{ km/hr}$$

170.(d) Relative speed $= (58 - 30)$
 km/hr

$$= \left(28 \times \frac{5}{18} \right) \text{ m/sec} = \frac{70}{9} \text{ m/sec}$$

$\therefore$ Length of the faster train

$$= \frac{70}{9} \times 18 = 140 \text{ metres}$$

171.(c) Clearly, train travels $162 -$
 $120 = 42$ metres in $18 - 15 = 3$
 seconds

$$\text{speed of train} = \frac{42}{3} = 14 \text{ m/sec.}$$

$\therefore$ In, 15 seconds train will cover

$$= \frac{42}{3} \times 15 = 210 \text{ m}$$

length of 1st platform 120

So,

i.e. length of the platform +
 length of the train $= 210$

$$\Rightarrow 120 + \text{length of the train} =$$

 210

$$\Rightarrow \text{length of the train} = 210 -$$

 $120 = 90 \text{ metres}$

172.(b) Let the speed of the
 second train be $x \text{ m/s}$

speed of first train $= 80 \text{ km/hr}$

$$= \frac{80 \times 5}{18} \text{ m/s}$$

$\therefore$ According to the question,

$$\frac{1000}{x + \frac{80 \times 5}{18}} = 18$$

$$\Rightarrow 1000 = 18x + 400$$

$$\Rightarrow x = \frac{600}{18} \times \frac{18}{5} \text{ km/hr}$$

$$= 120 \text{ km/hr}$$

Alternatively:-

Relative speed

$$= \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{1000}{18} \times \frac{18}{5} \text{ km/hr} = 200 \text{ km/hr}$$

speed of the second train

$$= 200 - 80 = 120 \text{ km/hr}$$

$$173.(c) \text{ Required ratio} = \frac{5}{6} : \frac{3}{5}$$

$$= 25 : 18$$

174.(c) Relative speed $= 56 - 29$
 $= 27 \text{ km/hr}$

$$= 27 \times \frac{5}{18} \text{ m/s} = \frac{15}{2} \text{ m/s}$$

$$\therefore \text{Required length} = \frac{15}{2} \times 10 =$$

 75 metres

175.(d) Clearly, train travels 90
 metres in $30 - 15 = 15$ sec

$$\text{i.e. speed of the train} = \frac{90}{15}$$

$$= 6 \text{ m/s} = 6 \times \frac{18}{5} \text{ km/hr}$$

$$= \frac{108}{5} = 21.6 \text{ km/hr}$$

176.(c) Clearly, train travels 300
 metres in $25 - 10 = 15$ seconds

$\therefore$ In 25 seconds, it will travel

$$= \frac{300}{15} \times 25 = 500 \text{ metres}$$

$$\text{i.e. length of train} = 500 - 300$$

 $= 200 \text{ m}$

$$\text{speed} = \frac{200}{10} = 20 \text{ m/sec.}$$

$\therefore$ Required time, to cross 200
 m long platform

$$= \frac{200 + 200}{20} = 20 \text{ seconds}$$

177.(d) Let the length of the train
 travelling at 48 km/hr be $2x$
 metres and the length of plat-
 form be y metres

Relative speed of train $= (48 +$
 $42) \text{ km/hr}$

$$= 90 \times \frac{5}{18} \text{ m/s} = 25 \text{ m/s}$$

$$\text{and } 48 \text{ km/hr} = \frac{48 \times 5}{18} \text{ m/s}$$

$$= \frac{40}{3} \text{ m/s}$$

According to the question,

Case - I:-

$$\frac{2x + x}{25} = 12 \Rightarrow 3x = 12 \times 25$$

$$\Rightarrow x = 100 \text{ metres}$$

$$\begin{aligned} \therefore \text{Length of the train (speed at } 48 \text{ km/hr)} &= 2x \\ &= 200 \text{ metres} \end{aligned}$$

Case - II:-

$$\frac{200 + y}{40/3} = 45$$

$$\Rightarrow 600 + 3y = 40 \times 45$$

$$\Rightarrow 3y = 1800 - 600 = 1200$$

$$\Rightarrow y = \frac{1200}{3} = 400 \text{ metres}$$

Alternatively:-

Let the lengths of the trains are $2x$ and x metre.

Total distance = Relative speed

$$\times \text{time} = 90 \times \frac{5}{18} \times 12 = 300 \text{ metres}$$

$x + 2x = 300$, $x = 100$ and $2x = 200$ and it crosses the platform in 45 seconds, so total distance covered in 45 seconds

$$= 48 \times \frac{5}{18} \times 45 = 600 \text{ metres}$$

length of the platform

$$= 600 - 200 = 400 \text{m}$$

178.(d) Clearly, train travels $210 - 122 = 88$ metres in $25 - 17 = 8$ seconds

$$\therefore \text{Speed of the train} = \frac{88}{8}$$

$$= 11 \text{ m/s}$$

$$= 11 \times \frac{18}{5} \text{ km/hr}$$

$$= 11 \times 3.6 \text{ km/hr}$$

$$= 39.6 \text{ km/hr}$$

179.(d) Relative speed = $36 - 9$

$$= 27 \text{ km/hr}$$

$$= 27 \times \frac{5}{18} = \frac{15}{2} \text{ m/s}$$

$\therefore$ Required time

$$= \frac{150}{15/2}$$

$$= 10 \times 2 = 20 \text{ sec.}$$

180.(d) According to the question,

Relative speed

$$= \frac{300}{33} = \frac{100}{11} \text{ m/s}$$

$$= \frac{100}{11} \times \frac{18}{5} = \frac{360}{11} \text{ km/hr}$$

i.e. speed of train - speed of man

$$= \frac{360}{11}$$

$\Rightarrow$ speed of train

$$= \frac{360}{11} + 3 = \frac{393}{11} = 35 \frac{8}{11} \text{ km/hr}$$

181.(d) Relative speed = $35 - 25$

$$= 10 \text{ km/hr}$$

$$= 10 \times \frac{5}{18} = \frac{25}{9} \text{ m/s}$$

$\therefore$ Required time

$$= \frac{80 + 120}{25/9}$$

$$= \frac{200}{25} \times 9 = 72 \text{ seconds}$$

182.(c) **Note:-** Remember the train is taking 10 seconds extra because it is crossing a 100 metre platform.

$$v = \frac{100}{10} = 10 \text{ m/sec.}$$

Now from case : (i),

$$l = 15 \times 10 = 150 \text{ metres}$$

183.(a) Clearly, train travels $300 - 240$

$$= 60 \text{m in } 21 - 18 = 3 \text{ sec.}$$

$$\therefore \text{speed of the train} = \frac{60}{3}$$

$$= 20 \text{m/s} = 20 \times \frac{18}{5} \text{ km/hr}$$

$$= 72 \text{ km/hr}$$

184.(b) Let after t seconds the train crosses another train.

$$\therefore t = \frac{(110+170)18}{60 \times 5}$$

$$= 16.8 \text{ seconds.}$$

185.(b) Let the length of each train be x metre.

Relative speed = $46 - 36$

$$= 10 \text{ km/hr}$$

$$= 10 \times \frac{5}{18} \text{ m/s} = \frac{25}{9} \text{ m/s}$$

$$\therefore \frac{x+x}{25/9} = 36$$

$$\Rightarrow \frac{2x \times 9}{25} = 36$$

$$\Rightarrow x = 50 \text{ m}$$

186.(b) Let the length of each train = L metres

$$\therefore \text{Speed of first train} = \frac{L}{3} \text{ m/s}$$

and speed of second train

$$= \frac{L}{4} \text{ m/s}$$

They are moving in opposite directions

$\therefore$ Relative speed

$$= \frac{L}{3} + \frac{L}{4} = \frac{7L}{12} \text{ m/s}$$

$$\text{Total length} = L + L = 2L \text{ m.}$$

$$\therefore \text{Time taken} = \frac{2L}{\frac{7L}{12}}$$

$$= \frac{24}{7} = 3 \frac{3}{7} \text{ sec}$$

Alternatively:-

$$\boxed{\text{The required time} = \frac{2t_1 t_2}{t_1 + t_2}}$$

$$= \frac{2 \times 3 \times 4}{3 + 4} = \frac{24}{7} = 3 \frac{3}{7} \text{ sec}$$

- 187.(c) Let the speed of train be x km/hr & its length be y km
When the train crosses a man, it covers its own length.
According to the question,

$$\frac{y}{(x-3) \times \frac{5}{18}} = 10$$

$$\Rightarrow 18y = 10 \times 5(x-3)$$

$$\Rightarrow 18y = 50x - 150 \quad \dots(i)$$

and $\frac{y}{(x-5) \times \frac{5}{18}} = 11$

$$\Rightarrow 18y = 55(x-5)$$

$$\Rightarrow 18y = 55x - 275 \quad \dots(ii)$$

From (i) & (ii),
 $55x - 275 = 50x - 150$
 $\Rightarrow 5x = 125$

$$\Rightarrow x = \frac{125}{5} = 25$$

$\therefore$ Speed of the train = 25 km/hr

Short-cut:-

3 km/hr 10sec.	5 km/hr 11 sec.
-------------------	--------------------

$$\frac{3 \times 10 = 30}{5 \times 11 = 55}$$

$\therefore$ Required speed of train

$$= \frac{55 - 30}{11 - 10} = 25 \text{ km/hr}$$

- 188.(b) Let the length of the train is l m.

Girl A : Girl B
(S₁) : (S₂)

Speed $\rightarrow$ 3 km/h : 6 km/h
(T₁) : (T₂)

Time to Pass $\rightarrow$ 36sec : 30 sec

Note :- In such type of question use this formula to find the speed of the train

$$\text{Speed} = \left| \frac{S_1 T_1 - S_2 T_2}{T_1 - T_2} \right| \text{ km/h}$$

from above formula :

Speed of the train

$$= \frac{30 \times 6 - 36 \times 3}{36 - 30} = 12 \text{ km/h}$$

$$\text{length of the train } (l) = t \times v$$

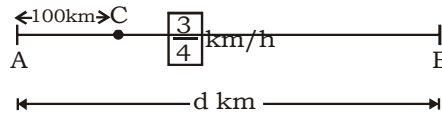
$$= (12 + 3) \times 36$$

$$l = 15 \times 36 \times \frac{5}{18} = 150 \text{ m}$$

$$l = 150 \text{ m}$$

Note:- Girls and the train are moving in the opposite direction, so relative speed would be $(S_1 + S_2)$

- 189.(a) Let the original speed of the train is x km/h and the distance of the journey is d km.



Let C be the point where the train meets with an accident, from this point the train will move with the speed $3/4$ km/h of its former speed.

condition (I) :

Speed : Time	
Original $\rightarrow$ 4 : 3	$\left[\begin{matrix} T \propto \frac{1}{S} \end{matrix} \right]$
New $\rightarrow$ 3 : 4	

from question difference in time

$$= 1\frac{7}{8} = \frac{15}{8} \text{ hours}$$

$$1 \text{ unit} \rightarrow \frac{15}{8}$$

$$3 \text{ units} \rightarrow \frac{15}{8} \times 3 = \frac{45}{8} \text{ hours}$$

Condition (II):-

When accident would occurred at 60 km ahead then required

$$\text{time} = \frac{15}{8} - \frac{15}{60} = \frac{13}{8} \text{ hours}$$

$$\text{Similarly} \rightarrow 1 \text{ unit} \rightarrow \frac{13}{8}$$

$$3 \text{ units} \rightarrow \frac{39}{8} \text{ hour}$$

Now train would travel 60 km

$$\text{in } \left(\frac{45}{8} - \frac{39}{8} \right) \text{ hours}$$

$$\text{speed} = \frac{60 \times 8}{6} = 80 \text{ km/h}$$

$$\text{distance} = T \times V = 80 \times \frac{45}{8}$$

$$= 450 \text{ km}$$

$$\text{Total distance} = 450 + 100 = 550 \text{ km}$$

- 190.(b) Speed of train

$$= \frac{\text{Distance}}{\text{Time}} = \frac{10}{12/60} \text{ km/hr}$$

$$= \frac{10 \times 60}{12} = 50 \text{ km/hr}$$

$$\therefore \text{New speed} = 45 \text{ km/hr}$$

$$\therefore \text{Required time} = \frac{10}{45} \text{ hours}$$

$$= \frac{2}{9} \times 60 \text{ minutes} = \frac{40}{3} \text{ minutes}$$

$$= 13 \text{ minutes } 20 \text{ seconds}$$

- 191.(d) Speed of Pawan (Ps)

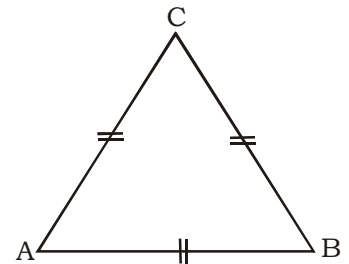
$$= 36 \text{ km/h}$$

from question,

$$\text{Speed of Bhuvnesh (Bs)} = \frac{36}{2}$$

$$= 18 \text{ km/h}$$

- 192.(b)



$AB = BC = CA$ [It is clear from question]

Bhuvnesh takes 2 hours to travel from A to B then distance (AB) = $2 \times 18 = 36 \text{ km}$

similarly we know

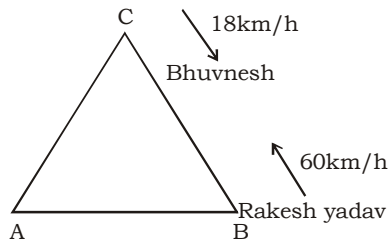
$AB = AC$ then distance between A to C = 36 km

time taken by Rakesh Yadav to complete a round trip of the three cities

$$= \frac{36 + 36 + 36}{60}$$

$$= \frac{108}{60} = 1 \text{ hour } 48 \text{ min.}$$

193.(b)



Rakesh Yadav and Bhuvnesh are moving towards each other then relative speed $(60 + 18) = 78 \text{ km/h}$

Time taken to meet

$$= \frac{36}{78} \text{ hours}$$

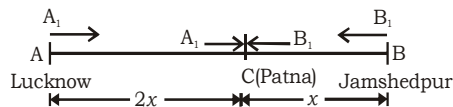
Distance from B

$$= \frac{36}{78} \times 60$$

$$= 27 \frac{9}{13} \text{ km}$$

Rakesh Yadav and Bhuvnesh will meet $27 \frac{9}{13}$ km away from B.

194.(d)



Let C is a point where both the trains A_1 and B_1 meet.

These two trains meet only at C and A i.e. These are only two points.

195.(b) See figure of question no. 108

Distance covered by A	$2x$	$2x$	$4x$	$2x$	$4x$
Distance covered by B	x	$4x$	$2x$	$4x$	$2x$
Point of meeting	P	A	P	A	P

$$\text{Required ratio} = \frac{14x}{13x} = 14 : 13$$

Alternatively:-

We have explained the formula $(2n - 1)D$

They will be at P (IIIrd time) in 5th meeting, then total distance $= (2 \times 5 - 1)d = 9D$

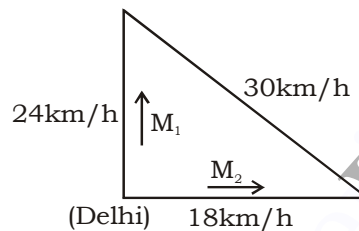
Distance in one meeting $= 2x + x = 3x$

Total distance $= 9 \times 3x = 27x$

Note:- Now check the sum of distance $= 27x$.

This will be your answer.

196.(b) This question is based on Pythagoras Triplets.



distance between them in 1

$$\text{hour} = \frac{60}{2} = 30 \text{ km}$$

from question $S_1 - S_2 = 6 \text{ km/h}$ where S_1 and S_2 are speeds of men.

So, speed of slower man $= 18 \text{ km/h}$

197.(c) Relative speed $= 45 - 40$

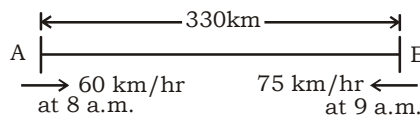
$= 5 \text{ km/hr}$

$\therefore$ Required distance

$$= \left(5 \times \frac{45}{60} \right) \text{ km} = \frac{15}{4} \text{ km}$$

$= 3 \text{ km } 750 \text{ metre.}$

198.(c)



Distance travelled by first train in one hour $= 60 \times 1$

$= 60 \text{ km}$

Therefore, distance between two trains at 9 a.m.

$= 330 - 60 = 270 \text{ km}$

Now, Relative speed of two train $= 60 + 75 = 135 \text{ km/hr}$

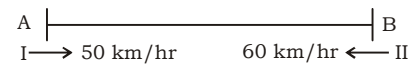
$\therefore$ Time of meeting of two trains

$$= \frac{270}{135} = 2 \text{ hrs}$$

Therefore, both the trains will meet at $9 + 2$

$= 11 \text{ a.m.}$

199.(c)



Let they meet after 1 hour,

$\therefore$ In 1 hour,

Ist train will cover $= 50 \text{ km}$

& IInd train will cover $= 60 \text{ km}$

$\therefore$ Total distance between A and B $= 50 + 60 = 110 \text{ km}$

and difference $= 60 - 50 = 10 \text{ km}$ i.e. II travels 10 km more in one hour.

But, the given difference

$= 120 \text{ km}$

i.e. $10 \longrightarrow 120$

$\therefore 1 \longrightarrow 12$

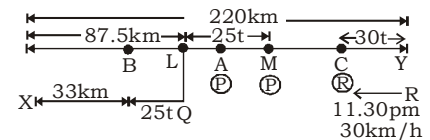
$\Rightarrow 110 \longrightarrow 12 \times 110$

$= 1320$

i.e. the required distance

$= AB = 1320 \text{ km}$

200.(a)



$P \rightarrow 25 \text{ km/h} \rightarrow 8 \text{ am}$

$Q \rightarrow 20 \text{ km/h} \rightarrow 9.51 \text{ am}$

Till 11:30 am the distance covered by the train P $= \frac{7}{2} \times 25$

$= 87.5 \text{ km}$

Till 11:30 am the distance covered by the train Q

$= \frac{99}{60} \times 20 = 33 \text{ km}$

Now for all the trains time is equal

Let the train P will be at same distance from Q and R after t hours.

Now distance travelled by P in t hours $= 25t$

distance travelled by Q in t hours $= 20t$

distance travelled by R in t hours $= 30t$

From question $LM = MC$

$$87.5 + 25t - 33 - 20t = 220 - 30t - 87.5 - 25t$$

$$60t = 78 \Rightarrow t = \frac{78}{60} \times 60$$

$$t = 78 \text{ min}$$

$\therefore$ train P will be at equal distance from Q and R at (11:30 + 78)

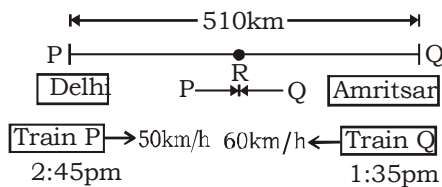
$$= 12 : 48 \text{ pm}$$

Distance from X $\rightarrow 87.5 + 25t$

$$\Rightarrow 87.5 + 25 \times \frac{78}{60}$$

$$= 120 \text{ km}$$

201. (c)



Let R is a point where both the trains P and Q meet Till 2 : 45 pm the distance covered by the train Q

$$= \frac{70}{60} \times 60 = 70 \text{ km}$$

Remaining distance

$$= 510 - 70 = 440 \text{ km}$$

Now both trains will move then relative speed

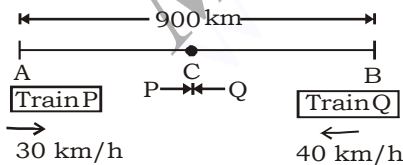
$$= 50 + 60 = 110 \text{ km/h}$$

Required time in meeting

$$= \frac{440}{110} = 4 \text{ hours}$$

Distance from Delhi to meeting point R = $4 \times 50 = 200 \text{ km}$
so we can say the train will meet 200 km away from Delhi.

202. (a)



Let C be the point where both the trains P and Q meet. Distance covered by the train Q in 20 minutes

$$= \frac{20}{60} \times 40 = \frac{40}{3} \text{ km}$$

Remaining distance

$$= 900 - \frac{40}{3} = \frac{2660}{3} \text{ km}$$

Now both the trains will move then

$$\text{Relative speed} = (30 + 40)$$

$$= 70 \text{ km}$$

Required time in meeting

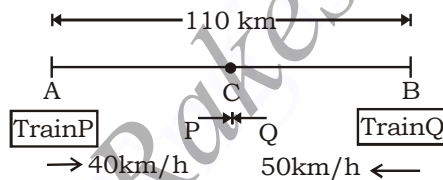
$$= \frac{2660}{3 \times 70} = \frac{38}{3} \text{ hours}$$

Distance from A to meeting point C = $t \times v$

$$= \frac{38}{3} \times 30 = 380 \text{ km}$$

So the trains will meet of 380 km away from A .

203. (d)



Let C be the point where both the trains P and Q meet. Distance covered by the train Q in 2 hours = $2 \times 50 = 100 \text{ km}$

Remaining distance

$$= (110 - 100) = 10 \text{ km}$$

Now both the trains will move then

$$\text{Relative speed} = (40 + 50)$$

$$= 90 \text{ km/h}$$

Required time in meeting

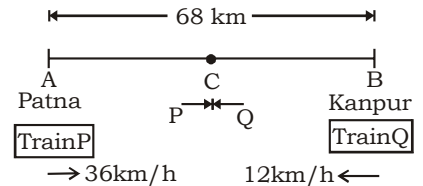
$$= \frac{10}{90} = \frac{1}{9} \text{ hour}$$

Distance from A to meeting

$$\text{point C} = 40 \times \frac{1}{9} = 4 \frac{4}{9} \text{ km}$$

so the trains will meet at $4 \frac{4}{9}$ km away from A

204. (b)



$$10 \text{ m/sec} = 10 \times \frac{18}{5}$$

$$= 36 \text{ km/h}$$

$$\frac{10}{3} \text{ m/sec} = \frac{10}{3} \times \frac{18}{5}$$

$$= 12 \text{ km/h}$$

Let C be the point where both the trains P and Q meet . Distance covered by the train P

$$\text{in 20 minutes} = \frac{20}{60} \times 36$$

$$= 12 \text{ km}$$

$$\text{Remaining distance} = 68 - 12 = 56 \text{ km}$$

Now both the train will move then- Relative speed

$$= (36 + 12) = 48 \text{ km/h}$$

Required time in meeting

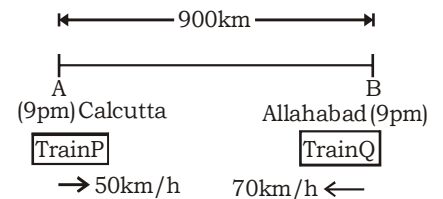
$$= \frac{56}{48} = \frac{7}{6} \text{ hours}$$

Distance from A to the meeting point C

$$= \frac{7}{6} \times 36 = 42 \text{ km}$$

So the trains will meet at 42 km away from A.

205. (a)



Both the trains are moving in opposite direction then relative speed

$$= (50 + 70) = 120 \text{ km/h}$$

Required time in crossing each other

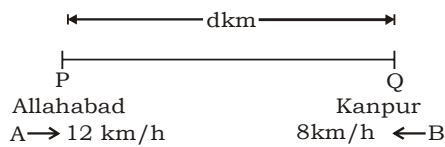
$$= \frac{900}{120} = 7.5 \text{ hours}$$

They will pass each other at = (9 pm + 7.5 hours) = 4 : 30 am
Distance from calcutta to meeting point

$$= \frac{15}{2} \times 50 = 375 \text{ km}$$

so the trains will meet at 375 km away from calcutta.

206.(a)



Let the distance between Allahabad and Kanpur is d km. according to the question, B starts 2 hours later and they meet in 9 hours after B started.

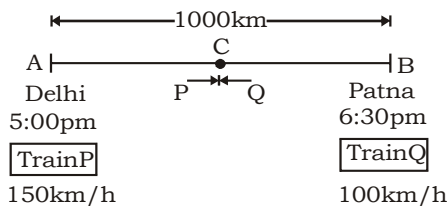
Then we conclude A travels for 11 hours then

$$d = 11 \times 12 + 9 \times 8$$

$$d = 132 + 72 \Rightarrow d = 204 \text{ km}$$

Distance between Allahabad and Kanpur is 204 km.

207.(a)



Let C be the point where both the trains P and Q meet. Distance covered by the train P till 6 : 30 pm

$$= 150 \times \frac{3}{2} = 225 \text{ km}$$

Remaining distance

$$= (1000 - 225) = 775 \text{ km}$$

Now both the trains will move then

Relative speed

$$= (150 + 100) = 250 \text{ km/h}$$

Required time in meeting

$$= \frac{775}{250} = \frac{31}{10} \text{ hours}$$

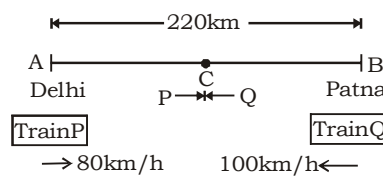
Distance from Delhi to meeting point C

$$= \frac{31}{10} \times 150 = 465 \text{ km}$$

Total Distance from Delhi to C = 465 + 225 = 690 km

Hence the trains will meet at 690 km away from Delhi.

208.(b)



Let C be the point where both the trains P and Q meet. Distance covered by the train P in 30 minutes

$$= \frac{1}{2} \times 80 = 40 \text{ km}$$

Remaining Distance

$$= 220 - 40 = 180 \text{ km}$$

Now both the trains will move then

Relative speed

$$= (80 + 100)$$

$$= 180 \text{ km/h}$$

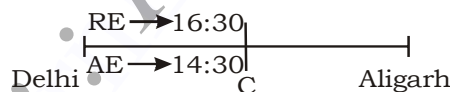
Required time in meeting

$$= \frac{180}{180} = 1 \text{ hour}$$

Distance from Delhi to meeting point C = 80 × 1 = 80 km

Hence the trains will meet at 40 + 80 = 120 km away from A.

209.(a)



AE → 60 km/h

RE → 80 km/h

Let C be the point where both the trains meet.

Distance travelled by the Aligarh Express.

$$(AE) \text{ in 2 hours} = 60 \times 2 = 120 \text{ km}$$

According to the question,

Now both the trains AE and RE are moving in the same direction,

∴ Relative speed

$$= (80 - 60) = 20 \text{ km/h}$$

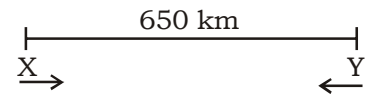
Required time in meeting

$$= \frac{120}{20} = 6 \text{ hours}$$

Total distance from Delhi to meeting point C

$$= 6 \times 80 = 480 \text{ km}$$

210.(a)



Let the speed of trains is x and y km/h respectively.

From condition (i) They meet after 10 hours :

$$10x + 10y = 650$$

$$(x + y) = 65 \quad \dots (i)$$

Trains are moving in opposite direction relative speed

$$= (x + y) = 65 \text{ km/h}$$

From condition (ii) Distance covered in 8 hours by the trains = 65 × 8 = 520 km

Difference in distance

$$= 650 - 520 = 130 \text{ km}$$

Note:- This difference is because one train starts 4 hours 20 mins late.

So, now speed of the first train

$$= \frac{130}{\left(4 + \frac{1}{3}\right)} = 30 \text{ km/h}$$

from equation (i), speed of IInd train = 65 - 30 = 35 km/h

211.(a) Assume speed of the train = V km/h

speed of the man = 6 km/h (given)

∴ Both are moving in the same direction

∴ Relative Speed

$$= (V - 6) \text{ km/h}$$

$$\text{we know } \Rightarrow t = \frac{d}{v}$$

$$\Rightarrow 45 = \frac{450 \times 18}{(V - 6) \times 5}$$

$$5V - 30 = 180 \Rightarrow 5V = 210$$

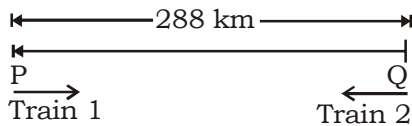
$$V = 42 \text{ km/h}$$

∴ The trains reaches to next station after 1 hour then it will travel 42 km in next one hour. To cover the same distance time taken by the man

$$t = \frac{d}{v} = \frac{42}{6} = 7 \text{ h}$$

time (t) = 7 hours

212.(a)



Let the speed of train₁ and train₂ is respectively x km/h and y km/h

Both the trains are moving in opposite direction then

relative speed = $(x + y)$ km/h

From condition (i)- They meet after 8 hours then-

$$8(x + y) = 288$$

$$\Rightarrow x + y = 36 \quad \dots(i)$$

from condition (ii),

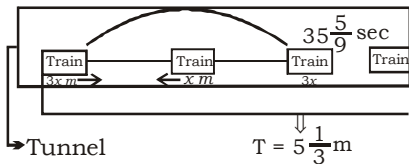
$$(x - y) = 11 \quad \dots(ii)$$

from equation (i) & equation (ii)

$$x = 23\frac{1}{2} \text{ km/h and } y$$

$$= 12\frac{1}{2} \text{ km/h}$$

213.(a) Assume length of the first train = $3x$ km and length of other train = x km



speed of the trains = 45 km/h and 36 km/h respectively.

Trains are moving in opposite directions then relative speed = $(45 + 36) = 81$ km/h

From question:-

$$\frac{320}{9} = \frac{(3x+x) \times 18}{(81) \times 5}$$

$$\Rightarrow 800 = 4x \Rightarrow x = 200 \text{ m}$$

$$3x = 600 \text{ m}$$

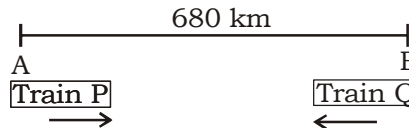
Assume length of tunnel = d then,

$$\frac{16}{3} \times 60 = \frac{(d+600)}{45 \times 5} \times 18$$

$$4000 = d + 600 \Rightarrow d = 3400 \text{ m}$$

lengths of trains = 600 m and 200m

214.(a)



Let train P and Q are moving with a speed of x km/h and y km/h respectively.

Both the trains are moving in opposite direction then relative speed = $(x + y)$

According to the question,

Condition(i):-

$$8(x + y) = 680 \Rightarrow x + y = 85 \dots(i)$$

Condition (ii):-

Distance travelled by both the trains in $26/5$ hours

$$= \frac{26}{5} \times 85 = 442 \text{ km}$$

Remaining distance

$$= 680 - 442 = 238 \text{ km}$$

Note:- The difference in the distance is because of one train

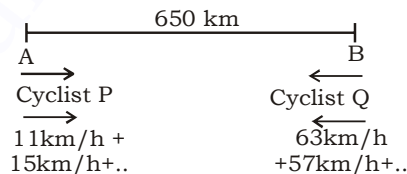
starts (P) at $\frac{119}{20}$ hours late.

$$\text{Then speed of P} = \frac{238}{119} \times 20$$

$$= 40 \text{ km/h}$$

$$\text{Then speed of Q} = 85 - 40 = 45 \text{ km/h}$$

215.(a)



Both the cyclist P and Q are moving in the opposite direction the relative speed at every hour.

$$(11+63) + (15+57) + \dots$$

$$74 + 72 + 70 + \dots$$

Relative speed will decrease 2 km/h for each hour.

Let they will meet after t hours then

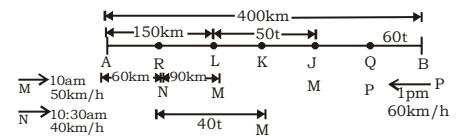
$$\frac{t}{2} [2 \times 74 + (t - 1) \times -2] = 650$$

$$t[74 - t + 1] = 650$$

$$\Rightarrow t(75 - t) = 650$$

Take help from option - put $t = 10$ then both sides of the equation will be equal so we can say **$t = 10$ hours**

216.(a)



Till 1 pm distance covered by train M = $50 \times 3 = 150$ km

Till 1 pm distance covered by

$$\text{train N} = \frac{3}{2} \times 40 = 60 \text{ km}$$

Let after t hours train P has the equal distance from the trains M and N.

Distance travelled by M in t hours = $50t$ km

distance travelled by N in t hours = $40t$ km

distance travelled by P in t hours = $60t$ km

from question,

$$(KJ = JQ)$$

$$150 + 50t - 60 - 40t$$

$$= 400 - 60t - 150 - 50t$$

$$t = \frac{160}{120} \text{ hours}$$

$$\Rightarrow t = 80 \text{ min}$$

Train M will be at equal distance from N and Q at (1 pm + 80 min) = 2 : 20 pm,

Distance from A = $150 + 50t$

$$= 150 + 50 \times \frac{80}{60} = 216\frac{2}{3} \text{ km}$$

217.(a) Let the length of first train = x m

then length of the other train = $(x + 120)$ m

Let the speed of the faster train = y km/h

Then from question,

Condition (i):-

when they moves in opposite direction then relative speed = $(y + 45)$ km/h

$$20 = \frac{(x+x+120) \times 18}{(y+45) \times 5}$$

$$\Rightarrow \frac{100}{18} (y + 45)$$

$$= 2x + 120 \quad \dots(i)$$

Condition (ii):-

When moves in same direction:

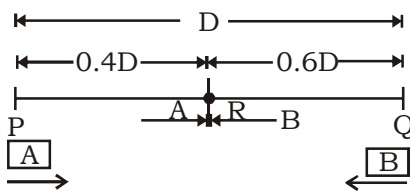
$$2 \times 60 = \frac{(x+x+120)18}{(y-45) \times 5}$$

$$\Rightarrow \frac{600}{18}(y-45)$$

$$= (2x + 120) \quad \dots(ii)$$

compared equation (i) & (ii) then
 $y = 63 \text{ km/h}$ put $y = 63 \text{ km/h}$ in equation (i)
then, $x = 240 \text{ m}$ length of the second train
 $= 240 + 120 = 360 \text{ m}$

218. (a)



According to the question,

The distance between P and Q is D km. From here we calculate the ratio of their speeds:

$$\begin{array}{ccc} \text{A} & : & \text{B} \\ \text{Speed} \rightarrow & 2 & : & 3 \end{array}$$

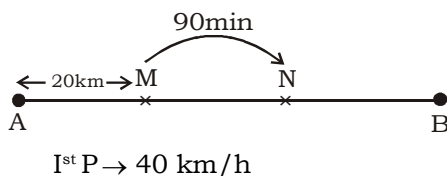
The 4th meeting would occur after a combined movements of
 $D + (2D \times 3) = 7D$ **Note (i):** Always remember the total distance covered for the n^{th} meeting $= (2n - 1)D$.**Note:- (ii):** Individually the distance travels by them would be in the ratio of their speeds.

Distance travelled by A

$$= \frac{7D}{5} \times 2 = 2.8D$$

But according to question distance can not be more than D. So 4th meeting occurs at a distance of $0.8D$ from P.

219. (b)

Ist P $\rightarrow 40 \text{ km/h}$ IInd Q $\rightarrow 50 \text{ km/h}$ IIIrd R $\rightarrow V \text{ km/h}$ Let speed of the third train (R)
 $= v \text{ km/h}$ **From question:-**Speed of the train P $= 40 \text{ km/h}$

$$\text{Speed of the train Q} = 40 \times \frac{125}{100}$$

$$= 50 \text{ km/h}$$

Condition (I):-

Time taken by the train R to overtake train P.

$$t = \frac{20}{(v-40)} \text{ hours} \quad \dots(i)$$

Till this time total distance covered by the train Q $= 25 +$

$$\frac{20 \times 50}{(v-40)} = \frac{25v - 1000 + 1000}{(v-40)}$$

$$= \frac{25v}{v-40} \text{ km}$$

Till this time distance covered by the train R

$$= \left(\frac{20v}{v-40} \right) \text{ km}$$

Difference in distance

$$= \frac{25v}{v-40} - \left(\frac{20v}{v-40} \right)$$

$$= \frac{5v}{v-40} \text{ km}$$

Condition (II):-

Time taken by train R in overtaking the train Q

$$= 90 \text{ min} = \frac{3}{2} \text{ hour,}$$

$$\frac{3}{2} = \frac{5v}{v-40}$$

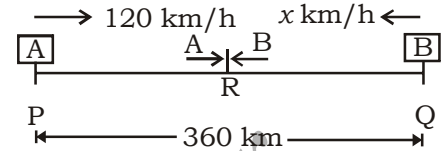
$$\Rightarrow \frac{3}{2} = \frac{5v}{(v-40)(v-50)} \quad \dots(ii)$$

Now help from options put $v = 60 \text{ km/h}$

$$\frac{3}{2} = \frac{60 \times 5}{20 \times 100} = \frac{300}{200} = \frac{3}{2}$$

both the sides of the equation satisfied so speed of the IIIrd train (R) $= 60 \text{ km/h}$

220 (a)



According to the question,

A takes 3 hours to meet Q then total distance between P and Q
 $= 3 \times 120 = 360 \text{ km}$ Let the speed of B is $x \text{ km/h}$

(i) Both are moving in opposite direction then :

$$2 = \frac{360}{120+x} \Rightarrow 120 + x = 180$$

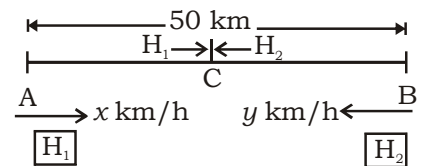
$$x = 60 \text{ km/h}$$

Ratio of speeds $= 120 : 60$

$$= 2 : 1$$

(ii) Speed of B $= 60 \text{ km/h}$.

221. (d)

Let the speeds of two horses (H_1 , H_2) is $x \text{ km/h}$ and $y \text{ km/h}$ respectively.**From question,****Condition (I):-**

They meet after an hour. C is a point where the horses meet.

$$x + y = 50 \quad \dots(i)$$

Condition (II):- H_1 reaches $5/6$ hours earlier than the second horse H_2 .

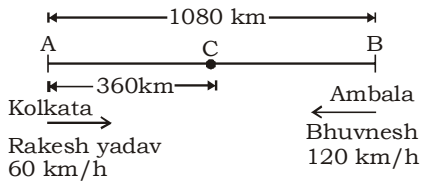
$$\frac{50}{y} - \frac{50}{x} = \frac{5}{6} \quad \dots(ii)$$

Now help from options put $y = 20 \text{ km/h}$ then x

$$= 30 \text{ km/h}$$

So, speed of the slower horse $= 20 \text{ km/h}$

222. (b)



Let C is a point where all the three meet.

Time taken to meet Rakesh Yadav and Bhuvnesh

$$= \frac{1080}{(60+120)} = 6 \text{ hours}$$

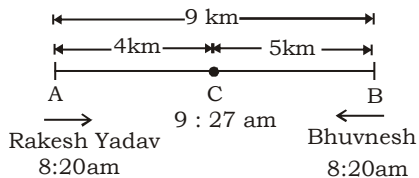
So in 6 hours distance covered by Rakesh Yadav = $6 \times 60 = 360 \text{ km}$

Time taken by Pawan to travel

$$360 \text{ km} = \frac{360}{90} = 4 \text{ hours}$$

Hence, pawan leaves Kolkata 2 hours later than Rakesh Yadav i.e. at 8 am pawan leaves Kolkata.

223. (c)



Let the distance between A and B is 9 km, and C is a point where Rakesh Yadav and Bhuvnesh meet. As they started at the same time so they will travel the distance in the ratio of their speeds.

From question,

Rakesh Yadav reaches at B after 65 mins from meeting.

Time to travel 5 km = 65 min

$$\text{Time to travel 1 km} = \frac{65}{5} \text{ min}$$

$$\text{Time to travel 4 km} = \frac{65}{5} \times 4$$

$$= 52 \text{ min}$$

$$\text{But he took } (9 : 27 - 8 : 20)$$

$$= 67 \text{ min}$$

It means he must have stayed at C for 15 minutes.

224. (c) Let the length of the train be L metres and speeds of the train, Rakesh Yadav and Bhuvnesh be x, y and z respectively then,

From question,

Condition (i):-

Rakesh Yadav is moving in the same direction of the train then,

$$36 = \frac{L}{x-y} \quad \dots (i)$$

Condition (ii):-

Bhuvnesh is moving in the opposite direction of the train then,

$$24 = \frac{L}{x+z} \quad \dots (ii)$$

then, from equation (i) & equation (ii),

$$36(x-y) = 24(x+z)$$

$$3x - 3y = 2x + 2z$$

$$x = 3y + 2z$$

$$x = 3y + 2z \quad \dots (iii)$$

In 30 minutes (1800 seconds), the train covers 1800 x (distance) and in the same time Rakesh Yadav covers 1800 y (distance)

The distance between Rakesh Yadav and Bhuvnesh, when the train has just crosses Bhuvnesh = $1800(x-y) - 24(y+z)$

Required time

$$= \frac{1800(x-y) - 24(y+z)}{y+z}$$

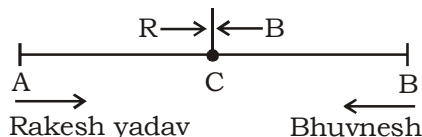
put $x = 3y + 2z$ from equation (iii)

$$\text{time} = \frac{1800(3y+2z-y) - 24(y+z)}{(y+z)}$$

$$\text{time} = \frac{(y+z)[3600 - 24]}{y+z}$$

Required time = 3576 seconds

225. (b)



Let the time taken by Rakesh Yadav in going from A to C is x minutes and the time taken by Bhuvnesh in going from B to C is y min.

From question :

Condition (I):-

The new speed of Rakesh Yadav is $\frac{2}{3}$, Therefore time taken in

$$\text{returning} = \frac{3}{2} x$$

$$x + \frac{3}{2} x = 120$$

$$x = 48 \text{ min}$$

But $x = y$ (given)

Condition (II):-

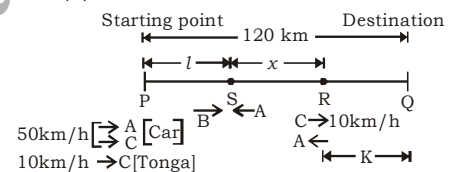
The new speed of Bhuvnesh is $\frac{4}{3}$

$$\text{time taken in returning} = \frac{3}{4} y$$

$$\text{Total time} = y + \frac{3}{4} y$$

$$= 48 + \frac{3}{4} \times 48 = 84 \text{ min.}$$

226. (c)



Let P and Q are the starting and destination points. R is a point where C got off and S is a point where A picks up B.

Let $PS = l$ and $RQ = K$ and $SR = x$

then

$$\frac{SR+SQ}{RQ} = \frac{50}{10} \quad [\text{Time is equal}]$$

$$\frac{2x+K}{K} = \frac{5}{1} \Rightarrow \frac{x}{K} = \frac{2}{1} \quad \dots (i)$$

Again,

$$\frac{PR+RS}{PS} = \frac{50}{10} \quad [\text{Time is equal}]$$

$$\frac{2x+l}{l} = \frac{5}{1} \Rightarrow \frac{x}{l} = \frac{2}{1} \quad \dots (ii)$$

From (i) & (ii) :

$$x : k : l = 2 : 1 : 1 \rightarrow 120$$

$$4 \text{ units} \rightarrow 120$$

$$1 \text{ unit} \rightarrow 30$$

$$x = 2 \times 30 = 60 \text{ km}$$

$$k = 1 \times 30 = 30 \text{ km}$$

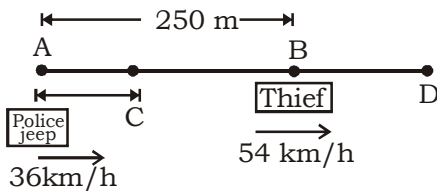
$$l = 1 \times 30 = 30 \text{ km}$$

Total distance travelled = $PR + RS + SQ = l + x + x + x + k = 240 \text{ km}$

$$\text{Time (required)} = \frac{240}{50}$$

$$= 4.8 \text{ hours.}$$

227.(b)



From question,

Condition (i):-

Thief takes 5 seconds to realize then distance covered by jeep in this time

$$= 5 \times 36 \times \frac{5}{18} = 50 \text{ m}$$

Now jeep is at point C.

Condition (ii):-

But police realize after 10 seconds then the extra distance covered by thief

$$= 18 \times \frac{5}{18} \times 10 = 50 \text{ m}$$

Now the thief is at point D.

Now police has increased his speed to 72 km/h.

$$\begin{aligned} \text{Relative speed} &= (72 - 54) \\ &= 18 \text{ km/h} \end{aligned}$$

Time taken in overtaking

$$= \frac{250 \times 18}{18 \times 5} = 50 \text{ seconds}$$

$$\text{Total time} = 5 + 10 + 50 = 65 \text{ seconds}$$

Total distance travelled by Police

$$= 15 \times 36 \times \frac{5}{18} + 50 \times 72 \times \frac{5}{18} = 150 + 1000 = 1150 \text{ m}$$

228.(d) Let initial time = t , distance = $2d$, speed = S_1

$$\therefore 2d = S_1 \times t \quad \dots\dots(i)$$

and final, Distance = d , time = $2t$ & speed = S_2

$$\therefore d = S_2 \times 2t \quad \dots\dots(ii)$$

$\therefore$ From (i) & (ii),

$$2 = \frac{S_1}{2S_2} \Rightarrow \frac{S_1}{S_2} = \frac{4}{1}$$

229.(b) Let man walked for t hours.

$$\therefore t \times 4 + (9 - t) \times 9 = 61$$

$$\Rightarrow 4t + 81 - 9t = 61$$

$$\Rightarrow 5t = 20 \Rightarrow t = 4 \text{ hours}$$

$$\begin{aligned} \therefore \text{Distance travelled on foot} \\ &= 4 \times 4 = 16 \text{ km} \end{aligned}$$

Alternatively:-

By Alligation Rule,

On foot	On bicycle
4 km/hr	9 km/hr
$\swarrow \quad \searrow$ $\frac{61}{9} \text{ km/hr}$ $\swarrow \quad \searrow$	
$9 - \frac{61}{9} = \frac{20}{9}$	$\frac{61}{9} - 4 = \frac{25}{9}$
$\therefore \text{Ratio of time} = \frac{20}{9} : \frac{25}{9}$ $= 4 : 5$	

and given total time = 9 hours
i.e. he walked on foot for 4 hours.

$\therefore$ Required distance

$$= 4 \times 4 = 16 \text{ hours}$$

230.(c) $t_1 = 4$ hours 48 minutes

$$= 4 \frac{48}{60} = \frac{24}{5} \text{ hours}$$

$$t_2 = 3 \text{ hours } 20 \text{ minutes}$$

$$= 3 \frac{20}{60} = \frac{10}{3} \text{ hours}$$

$$\therefore \frac{\text{A's speed}}{\text{B's speed}} = \sqrt{\frac{\text{B's time}}{\text{A's time}}} = \sqrt{\frac{10/3}{24/5}}$$

$$\Rightarrow \frac{45}{\text{B's speed}} = \sqrt{\frac{25}{36}} = \frac{5}{6}$$

$$\Rightarrow \text{B's speed} = 9 \times 6 = 54 \text{ km/hr}$$

231.(a) Solve similarly as previous question:

$$T_1 = 2 + \frac{24}{60} = \frac{12}{5} \text{ hours}$$

$$T_2 = 4 + \frac{16}{60} = \frac{64}{15} \text{ hours}$$

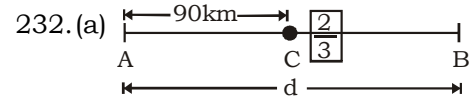
$$\frac{S_1}{S_2} = \sqrt{\frac{T_2}{T_1}} = \sqrt{\frac{64}{15 \times \frac{12}{5}}} = \sqrt{\frac{64}{12}} = \frac{4}{3}$$

$$= \sqrt{\frac{64 \times 5}{15 \times 12}} = \frac{8}{6} = \frac{4}{3}$$

$$S_1 : S_2 = 4 : 3$$

$$\frac{A}{B} = \frac{4 \times 20}{3 \times 20} \rightarrow 80 \text{ km/h}$$

Speed of A = 80 km/h



Let the original speed of the train is x km/h and the distance of the journey is d km.

Condition (I):

Difference in time

$$1 \text{ unit} \rightarrow 2 \text{ hours } 20 \text{ min}$$

$$2 \text{ unit} \rightarrow 4 \text{ hours } 40 \text{ min}$$

Condition (II):

Difference in time

$$1 \text{ unit} \rightarrow 2 \text{ hours } 32 \text{ min}$$

$$2 \text{ unit} \rightarrow 4 \text{ hours } 64 \text{ min}$$

Difference in actual time = 24 min

$$\text{Speed} = \frac{d}{t} = \frac{18}{24}$$

$$\text{Speed} = \frac{18}{24} \times 60 = 45 \text{ km/h}$$

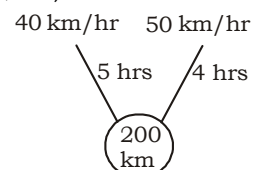
$$\text{Distance} = T \times V$$

$$= 45 \times \left(4 + \frac{2}{3}\right)$$

$$= \frac{14}{3} \times 45 = 210 \text{ km}$$

$$\begin{aligned} \text{Total distance} &= 210 + 90 \\ &= 300 \text{ km} \end{aligned}$$

233.(c) Let the distance between train and destination = LCM of (40, 50) = 200 km



$$\therefore \text{Difference in time} = 5 - 4 = 1 \text{ hour} = 60 \text{ minutes}$$

$$\text{But the given difference in time} = 11 - 5 = 6 \text{ minutes}$$

$$\text{i.e. } 60 \text{ units} \rightarrow 6$$

$$\Rightarrow 200 \text{ units} \rightarrow \frac{6}{60} \times 200 = 20$$

$$\text{i.e. Distance} = 20 \text{ km}$$

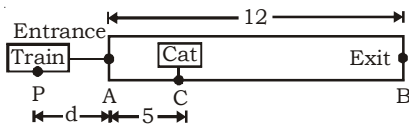
$\therefore$ required time

$$(\text{at speed } 40 \text{ km/hr}) = \frac{20}{40}$$

$$= \frac{1}{2} \text{ hour} = 30 \text{ minutes}$$

$$\therefore \text{Correct time} = 30 - 11 = 19 \text{ minutes}$$

234.(a)



Let AB is a tunnel. C is a point where a cat is located. The length of tunnel AB = 12 and the distance between A and C is 5. A is the entrance point and B is exit points of the tunnel, P is a point, where the train is approaching and the distance between P to A is d:

Now according to question,

Condition (I):-

Train : Cat

Ratio of speed d : 5
[where the cat is moving towards entrance point A]

Question (II):-

When the cat is moving towards the exit points B.

Train : Cat

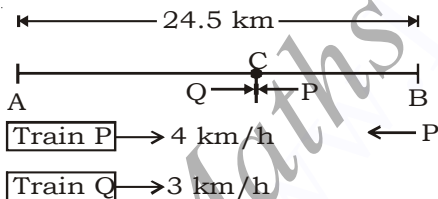
Speeds → 12 : 2
Ratio of their speeds = 6 : 1
Train : Cat = 6 : 1

Alternate:-

$$\frac{u}{v} = \frac{7+5}{7-5} = \frac{6}{1}$$

Note: Since the time is constant, therefore distances covered by train and cat will be in the ratio of their respective speeds.

235.(d)



Let C be the point where both the trains P and Q meet. When the trains will meet then they will have travelled twice of AB.

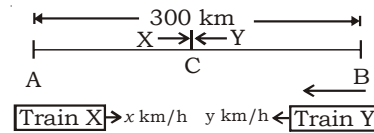
∴ Total distance travelled = $24.5 \times 2 = 49$ km

Note : When the time is same then the trains P and Q will travel distances in the ratio of their speeds.

Then, distance from A to C (meeting point) = $\frac{49}{7} \times 3 = 21$ km

So the trains will meet 21 km for from A.

236.(b)



Let the speed of train X and Y be the x km/h and y km/h respectively. C is a point where both the trains X and Y meet.

According to the question ;

They meet after 3 hours then:

$$3(x + y) = 300$$

$$x + y = 100 \quad \dots (i)$$

Since the faster train takes atleast $3 + 2 = 5$ hours to complete the journey.

$$\text{So speed of faster train} = \frac{300}{5}$$

$$= 60 \text{ km/h}$$

Now from equation (i)

$$60 + y = 100 \Rightarrow y = 40 \text{ km/h}$$

minimum speed of slower train (Y) = 40 km/h

Time taken by slower train to

$$\text{complete the journey} = \frac{300}{40}$$

$$= 7.5 \text{ hours}$$

237.(b) Time taken by faster train to travel 600 km

$$= \frac{600}{100} \times 60 = 360 \text{ min}$$

$$\text{Number of stoppages} = \frac{600}{75}$$

$$= (8 - 1) = 7 \rightarrow \text{Last stoppage will not count.}$$

$$\text{Time in stoppages} = 3 \times 7 = 21 \text{ min}$$

$$\text{Total time for faster train}$$

$$= 360 + 21 = 381 \text{ min}$$

for local train or slower train:

$$t = \frac{25}{50} \times 60 = 30 \text{ min}$$

To travel 25 km slower train will take

$$= 30 + 1 \quad (\text{stoppage time}) = 31 \text{ min}$$

It means 31 min → 25 km

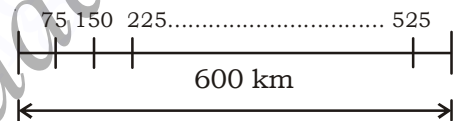
$$\begin{array}{l} \times 12 \\ \boxed{372} \text{ min} \end{array} \quad \begin{array}{l} \times 12 \\ \boxed{300} \text{ km} \end{array}$$

$$30 \text{ min} \rightarrow 25 \text{ km}$$

$$1 \rightarrow \frac{25}{30} \times 9 = 7.5 \text{ km}$$

In 381 min slower train 307.5 km.

Alternatively:-



∴ Total rest taken by faster train = 7

∴ And, in covering 600 km, time taken by faster train

$$= \frac{600}{100} = 6 \text{ hrs.}$$

∴ Total time taken by faster train in covering 600 km = 6 hours 21 minutes

Now,

Slower train:-

(50 km/hr)

in 6 hours, distance covered = $50 \times 6 = 300$ km

And total rests during 300 km = 12

[∴ rest taken after every 25 km distance]

$$\begin{array}{l} \therefore \text{rest time} = 12 \times 1 \\ = 12 \text{ minutes} \end{array}$$

i.e, for covering 300 km, it takes 6 hr 12 min.

∴ in remaining 9 min, it

$$\text{covers distance} = 50 \times \frac{9}{60}$$

$$= 7.5 \text{ km}$$

∴ Total distance covered by the slower train

$$= 300 + 7.5 = 307.5 \text{ km}$$

238. (a) Original speed of stream engine (S) = 24 km/h

Let reduction in speed = Δs

From question $\rightarrow \Delta s \propto \sqrt{n}$.

Where n = number of wagons

$$\Delta s = k\sqrt{n} \quad \dots(i)$$

when $n = 4$, $\Delta s = 24 - 20 = 4$ km/h put these values in equ.(i)

$$4 = k\sqrt{4}$$

$$k = 2$$

for maximum wagons $\rightarrow 24$

$$= 2 \times \sqrt{n}$$

$$\sqrt{n} = 12, n = 144$$

$$\text{maximum wagons} = 144 - 1$$

$$= 143 \text{ wagons}$$

Note:- If we continue with 144 wagons then the speed of the train would be less than 24 km/h or it will be stop. Because the train moves then required maximum wagons = $144 - 1 = 143$ wagons

239. (a) Let the speed of train = V km/h, and the time taken by the train = T hours

$$\text{from question} \rightarrow V \propto \frac{1}{\sqrt{T}}$$

$$\Rightarrow V = \frac{K}{\sqrt{T}} \quad \dots(i)$$

$$\text{from condition (i)} \quad 40 = \frac{K}{\sqrt{4}}$$

$$\Rightarrow K = 80$$

$$\text{from condition (ii)} \quad 60 = \frac{80}{\sqrt{T}}$$

$$= \sqrt{T} = \frac{80}{60} = \frac{4}{3} \Rightarrow T = \frac{16}{9}$$

$$\Rightarrow T = 1\frac{7}{9} \text{ hours}$$

Note:- In such questions make complete focus on conditions mention in question.

240. (c) From question : $\Delta s \propto \sqrt{n}$

$$\Rightarrow \Delta s = k\sqrt{n} \quad \dots(i)$$

where $\Delta s \rightarrow$ reduction in speed, $n \rightarrow$ no. of wagons, Δs

$$= (36 - 30) = 6 \text{ km/h, } n = 9,$$

put values in equ. (i)

$$6 = k\sqrt{9} \Rightarrow k = 2$$

for maximum wagons

$$\Rightarrow \Delta s = 36 \text{ km/h}$$

$$36 = 2\sqrt{n}, n = 324$$

maximum wagons

$$= 324 - 1 = 323$$

$$n = 323$$

241. (c) Let the distance be D .

According to the question,

$$\text{Time} = \frac{D}{25} + \frac{D}{4} = 5\frac{48}{60} = \frac{29}{5}$$

$$\frac{4D + 25D}{25 \times 4} = \frac{29}{5}$$

$$\Rightarrow \frac{29D}{25 \times 4} = \frac{29}{5}$$

$$D = 20 \text{ km}$$

242. (b) According to the question,

$$\text{Initial speed} = \frac{10 \text{ km}}{12} \times 60 \text{ /hr.}$$

$$= 50 \text{ km/hr.}$$

$$\text{Final speed} = 45 \text{ km/hr.}$$

$$\text{Final time} = \frac{10}{45} \times 60$$

$$= \frac{40}{3} = 13\frac{1}{3}$$

$$13 \text{ min } 20 \text{ sec}$$

243. (c) According to the question,

$$\text{speed} = \frac{120}{15} = 8 \text{ km/hr.}$$

$$\text{Half distance} = 60 \text{ km}$$

$$\frac{3^{\text{th}}}{5} \text{ of time} = \frac{3}{5} \times 15 = 9 \text{ hr.}$$

Speed to cover Remaining dis-

$$\text{tance} = \frac{60}{6} = 10 \text{ km/hr.}$$

244. (b) According to the question,

$$90 \text{ km} = 12 \times 7 + 6 \text{ km.}$$

For every 7 km, the time he takes

$$= \left(\frac{70}{3} + 6 \right) \text{ min.}$$

$$= \frac{88}{3} \text{ min.}$$

For every 12×7 km, time

$$\text{required} = \frac{88}{3} \times 12 \times \frac{1}{60}$$

$$= \frac{352}{60} \text{ hr.} = \frac{88}{15} \text{ hour}$$

For remaining 6 km,

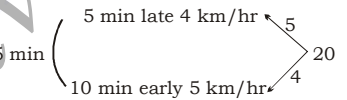
$$\text{time} = \frac{6}{18} = \frac{1}{3} \text{ hr.}$$

$$\text{Total time} = \frac{88}{15} + \frac{1}{3}$$

$$= \frac{88 + 5}{15} = \frac{93}{15} \text{ hr.}$$

$$= 6\frac{3}{15} = 6\frac{1}{5} \text{ hr.}$$

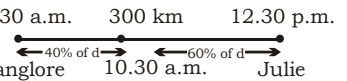
$$6 \text{ hr. } 12 \text{ min.}$$

245 (b) 

$$60 \text{ min} = 20 \text{ km}$$

$$1 \text{ min} = \frac{1}{3} \text{ km}$$

$$\therefore 15 \text{ min} = \frac{15}{3} = 5 \text{ km}$$

246. (d) 

According to the question,

$$\frac{40}{100} \text{ of } d = \frac{40}{100} \times 300 = 120 \text{ km.}$$

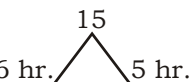
$$\text{Remaining distance} = 180 \text{ km.}$$

$$\text{Remaining time} = 2 \text{ hr.}$$

$$\text{Final speed} = \frac{180}{2} = 90 \text{ km/hr.}$$

$$\text{Initial speed} = \frac{120}{2} = 60 \text{ km/hr.}$$

$$\text{Increased speed} = 30 \text{ km/hr.}$$

247. (d) 

$$\frac{5}{2} \text{ km/hr. } 3 \text{ km/hr.}$$

$$\text{Difference in time} = 6 - 5$$

$$= 60 \text{ min} = 1 \text{ hr.}$$

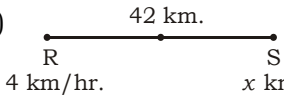
$$\text{But his actual difference of time} = 16 \text{ min}$$

$$60 \text{ unit} = 16 \text{ min}$$

$$1 \text{ unit} = \frac{16}{60}$$

So,

$$\text{Req. distance will be } 15 \times \frac{16}{60} = 4 \text{ km}$$

248. (a) 
 Let the speed of Romita be x km/hr.
 According to the question,
 $4 \times 6 + x \times 6 = 42$
 $6x = 18$
 $x = 3$ kmph

Alternate:-Relative Speed = $4 + x$

$$4 + x = \frac{42}{6} = 7$$

$$x = 3 \text{ km/hr.}$$

249. (a) Distance = 61 km

$$\text{Time on foot} = \frac{61}{4} \text{ hr.}$$

$$\text{Time on bicycle} = \frac{61}{9} \text{ hr.}$$

Use alligation method,

$$\begin{array}{ccc} \frac{61}{4} & & \frac{61}{9} \\ & \searrow \quad \swarrow & \\ & 9 & \\ & \swarrow \quad \searrow & \\ \frac{20}{9} & & \frac{25}{4} \end{array}$$

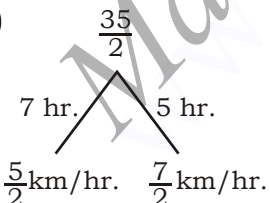
$$\text{Distance ratio } 80 + 225 = 305$$

$$305 \text{ units} = 61$$

$$1 \text{ unit} = \frac{1}{5}$$

$$80 \text{ unit} = \frac{1}{5} \times 80 = 16 \text{ km.}$$

$$\text{Distance travelled on foot} = 16 \text{ km}$$

250. (c) 
 $\frac{5}{2}$ km/hr. $\frac{7}{2}$ km/hr.

$$\text{Difference in time} = 2 \text{ hr} \\ = 120 \text{ min.}$$

$$\text{Actual difference} = 6 \text{ min late} + \\ 6 \text{ min early} = 12 \text{ min}$$

$$120 \text{ units} = 12$$

$$1 \text{ unit} = \frac{1}{10}$$

$$\text{Distance} = \frac{35}{2} \times \frac{1}{10} = \frac{7}{4} = 1 \frac{3}{4} \text{ km}$$

251. (a) Let the length of the train be
- x
- .

$$\frac{x+300}{21} = \frac{x+240}{18}$$

$$6x + 1800 = 7x + 1680$$

$$x = 120 \text{ m}$$

$$\text{speed of the train} = \frac{420}{21}$$

$$= 20 \times \frac{18}{5} \text{ km/hr.} = 72 \text{ km/hr.}$$

252. (d) Relative speed =
- $36 - 9$

$$= 27 \text{ km/hr.}$$

$$= 27 \times \frac{5}{18} = \frac{15}{2} \text{ m}^2/\text{sec}$$

$$\text{Time} = \frac{150}{15} \times 2 = 20 \text{ sec.}$$

253. (c) According to the question,

$$\text{Speed of the 1st train} = \frac{150}{30}$$

$$= 5 \text{ m/sec}$$

$$\text{Let speed of the 2nd} = x$$

$$\text{Relative speed} = 5 + x$$

$$5 + x = \frac{300}{10} = 25 \text{ m/s}$$

$$= 25 \times \frac{18}{5} = 90 \text{ km/hr.}$$

254. (c) Distance travelled by first train

$$\text{in 1 hour} = 60 \times 1 = 60 \text{ km}$$

$$\text{then, distance left between two} \\ \text{train} = 330 - 60 = 270 \text{ km}$$

$$\text{Now, Relative speed} = 60 + 75$$

$$= 135 \text{ km/hr.}$$

$$\therefore \text{Time taken to meet} = \frac{270}{135}$$

$$= 2 \text{ hrs.}$$

$$\therefore \text{they will meet at 11:00 am.}$$

255. (c) Time taken by trains before

$$\text{meeting point} = \frac{120}{(60 - 50)} = 12 \text{ hr.}$$

$$\text{Then, distance between A and B} \\ = (60 + 50) \times 12$$

$$= 1320 \text{ km}$$

256. (b) Let the speed of second train be
- x
- m/s.

and, speed of first train

$$= 80 \text{ km/hr}$$

$$= 80 \times \frac{5}{18} = \frac{400}{18} = \frac{200}{9} \text{ m/s}$$

According to the solution,

$$\frac{1000}{x + \frac{200}{9}} = 18$$

$$\Rightarrow 9000 = 18(9x + 200)$$

$$\Rightarrow 500 = 9x + 200$$

$$\Rightarrow x = \frac{300}{9} = \frac{100}{3}$$

$$\therefore \text{speed of second train} = x \text{ m/s}$$

$$= \frac{100}{3} \times \frac{18}{5} = 120 \text{ km/hr.}$$

- 257 (d) Speed of train =
- $\frac{150}{15} = 10 \text{ m/s}$

Then, let the speed of second train be x m/s

According to the question,

$$\frac{300}{x+10} = 12$$

$$\Rightarrow x = 15$$

$$\therefore \text{speed of second train} = 15 \text{ m/}$$

$$s = 15 \times \frac{18}{5} = 54 \text{ km/hr.}$$

258. (a) Time taken by two trains

$$\text{before meeting} = \frac{60}{(21-16)}$$

$$= 12 \text{ hours}$$

Then, distance between A and B

$$= 12(21 + 16)$$

$$= 37 \times 12$$

$$= 444 \text{ miles}$$

259. (c) In such type of question,

$$\frac{\text{Speed of X}}{\text{Speed of Y}} = \sqrt{\frac{\text{time taken by Y}}{\text{time taken by X}}}$$

$$\Rightarrow \frac{45}{Y} = \sqrt{\frac{3 \text{ hr. } 20 \text{ min}}{4 \text{ hr. } 48 \text{ min.}}}$$

$$\Rightarrow \frac{45}{Y} = \sqrt{\frac{200}{288}}$$

$$\Rightarrow Y = 54 \text{ km/hr.}$$

260. (c) In such type of question,

If new speed is $\frac{a}{b}$ of original speed.

then, change in time

$$= \left(\frac{b}{a} - 1 \right) \times \text{original time}$$

then, original time

$$= \frac{\text{Change in time}}{\left(\frac{b}{a} - 1 \right)}$$

$$= \frac{2}{\frac{4}{3} - 1} = 6 \text{ hours}$$

261 (a) Change in time = $\left(\frac{b}{a} - 1 \right) \times$

original time

(As in previous question)

⇒ Original time

$$= \frac{\text{Change in time}}{\left(\frac{b}{a} - 1 \right)} = \frac{\frac{3}{2}}{\left(\frac{4}{3} - 1 \right)}$$

$$= \frac{3}{2} \times \frac{3}{1} = 4\frac{1}{2} \text{ hours.}$$

262. (b) In such questions, use following method.

S	T	d (S × t)
+10	-1	10
+20	$-\frac{7}{4}$	35

$$\Rightarrow -s + 10t = 10 \quad \dots(i)$$

$$\text{and, } \frac{-7}{4}s + 20t = 35 \quad \dots(ii)$$

On solving (i) and (ii), we get

$$S = 60 \text{ km/hr}$$

$$T = 7 \text{ hours}$$

$$\therefore \text{Total distance} = 60 \times 7 = 420 \text{ km}$$

263. (b) As we know formula for

$$\text{average speed} = \left(\frac{2xy}{x+y} \right) \text{ km/hr.}$$

264. (d) Let the distance between office and house be x km

According to the question,

$$\frac{x}{5} - \frac{x}{6} = \frac{6+2}{60}$$

$$\Rightarrow \frac{6x - 5x}{30} = \frac{8}{60}$$

$$\Rightarrow x = 4$$

Distance between house and office = 4 km.

265. (b) Total distance travelled in 5 minutes

$$= 500 + 625 + 750 + 875 + 1000$$

$$= 3750 \text{ m} = 3.75 \text{ km}$$

$$\text{and, Time} = 5 \text{ min} = \frac{5}{60}$$

$$= \frac{1}{12} \text{ hour}$$

$$\therefore \text{Average speed} = \frac{3.75}{\frac{1}{12}}$$

$$= 45 \text{ km/hr}$$

266. (a) Distance → 1 : 2 : 3

Time → 3 : 2 : 1

As we know,

$$\text{Speed} = \frac{\text{Distance}}{\text{time}}$$

$$= \frac{1}{3} : 1 : 3 = 1 : 3 : 9$$

267. (c) From the question,

Let distance covered on 1st day be x km

$$\text{then, } \frac{x}{70} = \frac{4}{5}$$

$$x = 56 \text{ km}$$

$$\text{Ratio of distance} = \frac{\text{third day}}{\text{first day}}$$

$$= \frac{42}{56} = 3 : 4$$

268. (c) Relative speed = 40 - 20

$$= 20 \text{ km/hr.}$$

∴ Length of the faster train

$$= \frac{20 \times 5}{18} \times 5 = \frac{250}{9} = 27\frac{7}{9} \text{ m.}$$

269 (c) According to the question,

$$\text{Time taken by man} = \frac{20}{5}$$

$$= 4 \text{ hr.}$$

$$\text{Actual time} = 4 - \frac{4}{6}$$

$$= 4 - \frac{2}{3} = \frac{10}{3} \text{ hr.}$$

$$\text{Time taken at } 8 \text{ km/hr} = \frac{20}{8}$$

$$= \frac{5}{2} \text{ hr.}$$

$$\text{Time difference} = \frac{10}{3} - \frac{5}{2}$$

$$= \frac{5}{6} \text{ hr.} = 50 \text{ min}$$

270. (a) Let the distance between station A and B be x km,

$$\text{then speed of train} = \frac{x \times 60}{45}$$

$$= \frac{4x}{3} \text{ km/hr.}$$

$$\therefore \frac{x}{\frac{4x}{3} - 5} = \frac{48}{60} = \frac{4}{5}$$

$$16x - 60 = 15x$$

$$x = 60 \text{ km.}$$

271. (b) Let length of train be x m.

$$\therefore \text{speed of train} = \frac{x + 264}{20}$$

$$= \frac{x}{8}$$

$$5x = 2x + 528$$

$$3x = 528$$

$$x = 176 \text{ m}$$

272. (a) Let the length of the train be x .

According to the question,

$$\text{Speed of train} = \frac{x + 84}{21} = \frac{x}{9}$$

$$x = 63 \text{ m/sec}$$

$$\text{Required speed} = \frac{63}{9} \times \frac{18}{5}$$

$$= 25.2 \text{ kmph}$$

273. (b) Let the length of train be x $\therefore$ Speed of train

$$\frac{x}{7} = \frac{x + 390}{28}$$

$$3x = 390$$

$$x = 130\text{m}$$

274. (a) According to the question,

The time after which they meet =

$$\text{LCM of } \frac{252}{60}, \frac{308}{60}, \frac{198}{60}$$

$$= \frac{231}{5} = 46 \text{ min } 12 \text{ sec.}$$

275. (b) According to the question,

Difference in time = 8 sec.

Distance travelled by man in 5 min 52 min = Distance travelled by sound in 8 sec = $330 \times 8 = 2640 \text{ m}$

$$\therefore \text{Speed of man} = \frac{2640 \text{ m}}{352 \text{ sec}} \times \frac{18}{5}$$

$$= 27 \text{ kmph}$$

276. (a) Let Abhay's speed

$$= x \text{ kmph} = \frac{1}{m}$$

$$\text{Sameer's speed} = y \text{ kmph} = \frac{1}{n}$$

$$\therefore \frac{30}{x} - \frac{30}{y} = 2$$

$$30m - 30n = 2$$

$$m - n = \frac{1}{15}$$

Again A.T.Q

$$\frac{30}{y} - \frac{30}{2x} = 1$$

$$30n - 15m = 1$$

On solving we get

$$m = \frac{1}{5}$$

$$x = 5 \text{ kmph.}$$

277. (b) Let speed of A = x speed of B = y

According to the question,

$$x \times 6 + y \times 6 = 60$$

$$x + y = 10 \quad \dots(i)$$

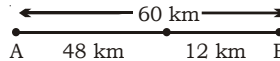
$$\frac{2}{3}x \times 5 + 2y \times 5 = 60$$

$$x + 3y = 18 \quad \dots(ii)$$

On solving (i) and (ii)

We get $x = 6 \text{ kmph.}$

278. (c)



According to the question,

Distance covered by Ajay $60 + 12 = 72 \text{ km}$

Distance covered by Ravi = 48 km

Ajay Ravi

$$72 : 48$$

$$3 : 2$$

[Ratio of Distance = Ratio of speed]

Difference = 1

$$1 \text{ unit} = 4$$

Speed of Ravi = $2 \times 4 = 8 \text{ km/hr.}$

$$279. (b) \frac{S_A}{S_B} = \frac{2}{1} \quad \frac{S_B}{S_C} = \frac{3}{1}$$

$$S_A : S_B : S_C = 6 : 3 : 1$$

$$D_A : D_B : D_C = 6 : 3 : 1$$

$$T_A : T_B : T_C = \frac{1}{6} : \frac{1}{3} : 1$$

$$1 : 2 : 6$$

$$6 \text{ units} = 1 + \frac{54}{60} = 1 + \frac{9}{10} = \frac{19}{10}$$

$$1 \text{ unit} = \frac{19}{10 \times 6}$$

Time taken by B

$$= \frac{19 \times 2}{10 \times 6} \times 60 \text{ min} = 38 \text{ min.}$$

280. (a) Speed of A, B, and C

$$= \frac{1000}{5}, \frac{1000}{8}, \frac{1000}{10}$$

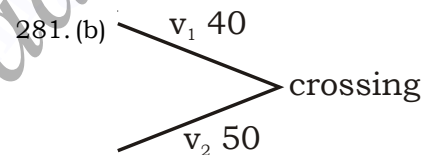
200 m/min, 125 m/min, 100 m/min

Distance travelled by B and C before A starts = 125, 200 m

Time taken by A to meet B and C

$$= \frac{125}{200 - 125}, \frac{200}{200 - 100}$$

$$= \frac{5}{3} \text{ min, } 2 \text{ min}$$



Let time taken be equal

$$\frac{40}{v_1} = \frac{50}{v_2}, \text{ then they will}$$

collide at the

$$\frac{v_1}{v_2} \neq \frac{40}{50} = \frac{4}{5}$$

282. (d) Speed of plane = $\frac{\text{Distance}}{\text{Time}}$

$$= \frac{6000}{8} = 750 \text{ km/h}$$

New speed = $(750 + 250) \text{ km/h}$

$$= 1000 \text{ km/h}$$

$$\therefore \text{Required time} = \frac{9000}{1000}$$

$$= 9 \text{ hr.}$$



BOAT & STREAM

Down Stream

When the Boat moves along the Stream of river then it is called Down Stream.

If speed of boat in still water

$$= x \text{ km/hr}$$

$$\text{Speed of stream} = y \text{ km/hr}$$

$$\text{Then down stream} = (x+y) \text{ km/hr}$$

Up-Stream: when the boat moves against the stream of water then it is called up-stream

$$\text{Up stream} = (x-y) \text{ km./hr.}$$

⇒ Speed of Boat

$$= \frac{\text{Down stream} + \text{up stream}}{2}$$

⇒ Speed of stream

$$= \frac{\text{Down stream} - \text{up stream}}{2}$$

TYPE - I

Example

1. A boatman rows 1 km in 5 minutes, along the stream and 6 km in 1 hour against the stream. The speed of the stream is

- (a) 3 kmph (b) 6 kmph
(c) 10 kmph (d) 12 kmph

Sol. (a) Boatman moves 1 km in 5 min, along the stream

$$\therefore \text{Downstream} = \frac{1 \text{ km}}{\frac{5}{60} \text{ hr.}}$$

$$= 12 \text{ km/hr.}$$

$$\text{and upstream} = \frac{6}{1} = 6 \text{ km/hr.}$$

Hence, the speed of stream

$$= \frac{\text{downstream} - \text{upstream}}{2}$$

$$= \frac{12-6}{2} = 3 \text{ km/hr.}$$

2. A boat covers 12 km upstream and 18 km downstream in 3 hours, while it covers 36 km upstream and 24 km down-

stream in $6\frac{1}{2}$ hours. What is the speed of the current?

- (a) 1.5 km/hr (b) 1 km/hr
(c) 2 km/hr (d) 2.5 km/hr

Sol. (c) Let, the upstream be $U = \frac{1}{x}$

the downstream be $D = \frac{1}{y}$

According to question,

$$\frac{12}{U} + \frac{18}{D} = 3$$

$$12x + 18y = 3 \quad \dots(i)$$

$$\frac{36}{U} + \frac{24}{D} = \frac{13}{2}$$

$$36x + 24y = \frac{13}{2} \quad \dots(ii)$$

eq. (i) $\times 3$ - eq. (ii), we get

$$54y - 24y = 9 - \frac{13}{2}$$

$$30y = \frac{5}{2}$$

$$y = \frac{1}{12}, x = \frac{1}{8}$$

$$D = 12 \text{ km/hr } U = 8 \text{ km/hr}$$

$$\text{Speed of the current} = \frac{1}{2}$$

$$(12 - 8) = 2 \text{ km/hr.}$$

3. A boy can swim in still water at a speed of 10 km/hr. If the speed of the current would have been 5 kmph, then the boy could swim 60 km

- (a) upstream in 4 hours
(b) downstream in 12 hours

(c) upstream in 6 hours

(d) downstream in 4 hours

Sol. (d) According to the question,
Speed of boy in still water = 10 km/hr.

Speed of current = 5 km/hr.

$$U = 5 \text{ km/hr.}$$

$$D = 15 \text{ km/hr.}$$

$$t_u = \frac{60}{5} = 12 \text{ hr.}$$

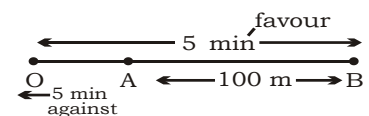
$$t_d = \frac{60}{15} = 4 \text{ hr.}$$

4. A swimmer swims from a point A against a current for 5 minutes and then swims backwards in favour of the current for next 5 minutes and comes to the point B. If AB is 100 metres, the speed of the current (in km per hour) is:

- (a) 0.4 (b) 0.2
(c) 1 (d) 0.6

Sol. (d) According to question,
Let the x = speed of water in still water

y = speed of the current.



$$\text{Upstream} = \frac{OA}{5} \times 60$$

$$= 12 \times OA = x - y$$

$$\text{Downstream} = \frac{OB}{5} \times 60$$

$$= 12 \times OB = x + y$$

$$OB - OA = 100 \text{ m}$$

$$x + y - x + y = 1200 \text{ m/hr.}$$

$$2y = 1200 \text{ m/hr.}$$

$$y = 600 \text{ m/hr}$$

$$= \frac{600}{1000} = 0.6 \text{ km/hr}$$



5. The speed of the current is 5 km/hour. A motorboat goes 10 km upstream and back again to the starting point in 50 minutes. The speed (in km/hour) of the motorboat in still water is

(a) 20 (b) 26
(c) 25 (d) 28

- Sol. (c) Let the speed of the boat in still water = x

$$D = 5 + x \quad U = x - 5$$

According to the question,

$$\frac{10}{5+x} + \frac{10}{x-5} = \frac{50}{60} = \frac{5}{6}$$

check it by option,

$$\frac{10}{25+5} + \frac{10}{25-5} = \frac{5}{6}$$

$$\frac{10}{30} + \frac{10}{20} = \frac{5}{6}$$

$$\frac{1}{3} + \frac{1}{2} = \frac{5}{6}$$

Alternate

$$\text{Use formula } TU + TD = \frac{2xD}{x^2 - y^2}$$

x = Speed in still water

y = speed of current

D = Distance.

$$\frac{50}{60} = \frac{2x \times 10}{x^2 - 25}$$

$$\frac{1}{24} = \frac{x}{x^2 - 25}$$

$$x^2 - 24x - 25 = 0$$

$$x = 25, -1$$

$$x = 25 \text{ km/hr.}$$

6. In a fixed time, a boy swims double the distance along the current that he swims against the current. If the speed of the

current is 3 km/hr, the speed of the boy in still water is

(a) 6 km/hr (b) 9 km/hr
(c) 10 km/hr (d) 12 km/hr

- Sol. (b) According to the question,
Let the speed of the boy in still water be x

$$\text{Downstream} = \frac{2d}{t} = x + 3 \dots(i)$$

$$\text{Upstream} = \frac{d}{t} = x - 3 \dots(ii)$$

On dividing

$$\frac{2}{1} = \frac{x+3}{x-3}$$

Apply C & D we get,

$$\frac{3}{1} = \frac{x}{3}$$

$$x = 9 \text{ km/hr.}$$

7. A man can row at a speed of $4\frac{1}{2}$ km/hr in still water. If he takes 2 times as long to row a distance upstream as to row the same distance in downstream, then, the speed of stream (in km/hr) is

(a) 1 (b) 1.5
(c) 2 (d) 2.5

- Sol. (b) Let the distance be d and Time = t

According to the question,

$$\text{Upstream} = \frac{d}{2t}$$

$$\text{Downstream} = \frac{d}{t}$$

$$\text{Speed in still water} \Rightarrow \frac{9}{2} \text{ km/hr}$$

$$= \frac{1}{2} \left[\frac{d}{t} + \frac{d}{2t} \right]$$

$$\frac{9}{2} = \frac{1}{2} \times \frac{3}{2} \frac{d}{t} = \frac{3}{4} \frac{d}{t}$$

$$\frac{d}{t} = 6 \text{ km/hr.}$$

$$\therefore D = 6 \text{ km/hr.}$$

$$U = 3 \text{ km/hr.}$$

Speed of stream

$$= \frac{1}{2} \times (6 - 3) = 1.5 \text{ km/hr.}$$

8. The speed of a boat in still water is 6 kmph and the speed of the stream is 1.5 kmph. A man rows to a place at a distance of 22.5 km and comes back to the starting point. The total time taken by him is:

(a) 10 hours
(b) 4 hours 10 minutes
(c) 6 hours 10 minutes
(d) 8 hours

- Sol. (d) According to the question,

$$\text{Downstream} = 6 + 1.5 = 7.5 \text{ kmph}$$

$$\text{Upstream} = 6 - 1.5 = 4.5 \text{ kmph}$$

$$t_D = \text{Distance} \times \text{speed of Downstream}$$

$$= \frac{22.5}{7.5} = 3 \text{ hr.}$$

$$t_U = \frac{22.5}{4.5} = 5 \text{ hr.}$$

$$\text{Total time } t_D + t_U = 3 + 5 = 8 \text{ hr.}$$

9. The speed of a motor-boat to that of the current of water is 36 : 5. The boat goes along the current in 5 hours 10 minutes. It will come back in
- (a) 5 hours 50 minutes
(b) 6 hours
(c) 6 hours 50 minutes
(d) 12 hours 10 minutes

- Sol. (c) Let the speed of motor boat in still water = $36x$

$$\text{and Speed of current} = 5x$$

$$\therefore \text{Upstream} = 36x - 5x = 31x$$

$$\text{Downstream} = 36x + 5x = 41x$$

$$\text{Distance} \Rightarrow 41x \times 5 \frac{10}{60}$$

$$= \frac{41}{6} \times 31x$$

$$t_U = \frac{D}{U_{\text{speed}}} = \frac{41 \times 31}{6 \times 31}$$

$$= \frac{41}{6} = 6 \frac{5}{6}$$

Alternate

$$V \propto \frac{1}{T}$$



$$\frac{V_1}{V_2} = \frac{T_1}{T_2}$$

$$\frac{36+5}{36-5} = \frac{x}{\frac{31}{6}}$$

$$\Rightarrow \frac{41}{6} = 6 \text{ hr. } 50 \text{ min.}$$

10. The speed of a motorboat in still water is 45 kmph. If the motorboat travels 80 km along the stream in 1 hours 20 minutes, then the time taken by it to cover the same distance against the stream will be

- (a) 3 hours
(b) 1 hours 20 minutes
(c) 2 hours 40 minutes
(d) 2 hours 55 minutes

Sol. (c) According to the question.

$$\text{Downstream} = \frac{80 \text{ km}}{1\frac{20}{60}} = 1\frac{1}{3}$$

$$= \frac{80 \times 3}{4} = 60 \text{ kmph.}$$

Speed of motorboat in still water =

$$\frac{1}{2}(D + U)$$

$$45 \times 2 = 60 + U$$

$$U = 30 \text{ kmph.}$$

time taken by it to cover against the stream =

$$\frac{8}{3} = 2\frac{2}{3}$$

$$2 \text{ hr. } 40 \text{ min.}$$

11. A boat goes 40 km up stream in 8 hours and 36 km downstream in 6 hours. The speed of the boat in still water is:

- (a) 6.5 km/hour
(b) 5.5 km/hour
(c) 6 km/hour
(d) 5 km/hour

Sol. (b) Speed of upstream,

$$U = \frac{40}{8} = 5 \text{ km/h}$$

Speed of Downstream,

$$D = \frac{36}{6} = 6 \text{ km/h}$$

Speed of boat in still water, x

$$= \frac{D+U}{2}$$

$$= \frac{5+6}{2} = \frac{11}{2} = 5.5 \text{ km/h.}$$

12. A motorboat in still water travels at a speed of 36 kmph. It goes 56 km upstream in 1 hour 45 minutes. The time taken by it to cover the same distance down the stream will be:

- (a) 2 hrs 25 min.
(b) 3 hrs
(c) 1 hrs 24 min.
(d) 2 hrs 21 min

Sol. (c) Speed of motor boat in still water, $x = 36 \text{ km/h}$

Speed of upstream, U

$$= \frac{56 \text{ km}}{1\frac{3}{4}} = \frac{56 \times 4}{7} = 32 \text{ km/hr}$$

According to the question,

$$x - y = U$$

$$36 - y = 32$$

$$y = 4 \text{ km/h.}$$

$$\text{Speed of Downstream, } D = x + y$$

$$= 36 + 4$$

$$= 40 \text{ km/h}$$

Time taken to cover the

$$\text{distance downstream} = \frac{56}{40}$$

$$= 1\frac{2}{5} \text{ h} = 1 \text{ hours } 24 \text{ minutes}$$

13. Two boats A and B start towards each other from two places, 108 km apart. Speed of the boat A and B in still water are 12 km/hr and 15 km/hr respectively. If A proceeds down and B up the stream, they will meet after.

- (a) 4.5 hours (b) 4 hours
(c) 5.4 hours (d) 6 hours

Sol. (b) $\xleftarrow{\hspace{1.5cm}} 108 \text{ km} \xrightarrow{\hspace{1.5cm}}$

$$A (12 + y) \rightarrow \quad \leftarrow (15 - y) B$$

Let the speed of stream = $y \text{ km/h}$

Since Boat A is moving downstream with 12 km/h

Speed of boat A = $(12 + y) \text{ km/h}$

Since Boat is moving upstream with 15 km/h

Speed of boat B = $(15 - y) \text{ km/h}$

$\therefore$ Both the boats are moving in opposite direction,

Relative speed of A and B = $12 + y + 15 - y = 27 \text{ km/h}$

$$\text{Time} = \frac{\text{Distance}}{\text{Relative speed}} = \frac{108}{27} = 4 \text{ hours}$$

14. A person can row $7\frac{1}{2} \text{ km}$ an hour in still water and he finds that it takes him twice as long to row up as to row down the river. The speed of the stream is :

- (a) 2 km/hr (b) 3 km/hr

- (c) $2\frac{1}{2} \text{ km/hr}$ (d) $3\frac{1}{2} \text{ km/hr}$

Sol. (c) Speed of person in still water

$$= \frac{15}{2} \text{ km/h}$$

Let the speed of current/stream = $y \text{ km/h}$

According to the question,

Upstream time

$$= 2 \times (\text{Downstream time})$$

$$\frac{\text{Distance}}{\text{upstream speed}}$$

$$= 2 \times \frac{\text{Distance}}{\text{Downstream speed}}$$

$$\frac{2}{15 - 2y} = 2 \times \frac{2}{15 + 2y}$$

On solving y

$$= 2\frac{1}{2} \text{ km/h.}$$

Alternate

$$\therefore T_u = 2 \times T_d$$

$$\therefore D : U = 2 : 1$$

$$\therefore x : y = (2 + 1) : (2 - 1) = 3 : 1$$

$$y = \frac{x}{3} = \frac{7\frac{1}{2}}{3} = 2\frac{1}{2} \text{ km/hr.}$$



15. A man rows to a place 35 km in distance and back in 10 hours 30 minutes. He found that he can row 5 km with the stream in the same time as he can row 4 km against the stream. Find the rate of flow of the stream.

(a) 1 km/hrs, (b) 0.75 km/hrs,
(c) 1.33 km/hrs,
(d) 1.5 km/hrs,

Sol. (b) Let speed of man and stream is 'V', 'U'

$$\text{The } \frac{5}{V+U} = \frac{4}{V-U}$$

[Travelling distance in same time]

$$5V - 5U = 4V + 4U$$

$$V = 9u \Rightarrow \frac{v}{u} = \frac{9}{1}$$

Let $u = x$, $v = 9x$

$$\frac{35}{2x} \left(\frac{1}{5} + \frac{1}{4} \right) = \frac{21}{2}$$

$$\Rightarrow \frac{5}{x} \times \frac{9}{20} = 3$$

$$x = \frac{3}{4} = 0.75$$

$$\begin{aligned} \text{Speed of stream} &= 1 \times 0.75 \\ &= 0.75 \text{ km/hr.} \end{aligned}$$

16. A motor boat covers a certain distance downstream in a river in 3 hours. It covers the same distance upstream in 3 hours and half. If the speed of the water is 1.5 km/h, then the speed of the boat in still water is:

(a) 17 km/h (b) 17.5 km/h
(c) 19.5 km/h (d) 19 km/h

Sol. (c) According to the question,

$$\begin{aligned} \text{Downstream speed } x + y &= \frac{d}{3} \\ \text{or } d &= 3(x + y) \dots\dots\dots(i) \end{aligned}$$

$$\text{Upstream speed } = x - y = \frac{d \times 2}{7}$$

$$\text{or } d = \frac{7}{2}(x - y) \dots\dots\dots(ii)$$

Compare both the distance

$$3(x + y) = \frac{7}{2}(x - y)$$

$$\begin{aligned} 6x + 6y &= 7x - 7y \\ x &= 13y \end{aligned}$$

Hence, y = Speed of current
= 1.5 km/h

$$x = 13 \times 1.5$$

$x = 19.5$ km/h (speed of boat in still water)

17. A boat running upstream takes 5 hours and 40 minutes to

cover a certain distance, while it takes 3 hours to cover the same distance down stream. What is the ratio between the speed of the boat and speed of the water current respectively?

(a) 13 : 4 (b) 20 : 1
(c) 19 : 2 (d) 1 : 19

Sol. (a) Let speed of Boat is V and stream is 'U'

	up stream	Down stream
Time $\rightarrow$	$5 \times 60 + 40$	3×60
	340	180
	17	9
Speed $\rightarrow$	9	17
	$\frac{V+U}{V-U} = \frac{17}{9}$	

Time $\rightarrow$ 5×60+40 3×60

340 180

17 9

Speed $\rightarrow$ 9 17

$$\frac{V+U}{V-U} = \frac{17}{9}$$

then, by C & D, We get

$$\frac{V}{U} = \frac{17+9}{17-9} = \frac{26}{8} = \frac{13}{4}$$

18. The water in a river is flowing at the rate of 4 km/hr. If the width and depth of the river is 8m and 4m respectively, then how much water will enter the sea in 15 minutes.

(a) 60000 m³ (b) 18000 m³
(c) 28800 m³ (d) 32000 m³

Sol. (d) If flows at 4km/h.

So in 15 minutes it travels $\rightarrow$ 1 km.

So vol. of water entering the sea in 15 minutes

$$= 8 \times 4 \times 1000$$

$$= 32000 \text{ m}^3$$



Exercise

1. The speed of a boat in still water is 2 km/hr. If its speed upstream be 1 km/hr, then speed of the stream is
(a) 2 km/hr (b) 3 km/hr
(c) 1 km/hr (d) 1.5 km/hr
2. The speed of a boat in still water is 10 km/hr. If its speed downstream be 13 km/hr, then speed of the stream is:
(a) 1.5 km/hr (b) 3 km/hr
(c) 11.5 km/hr (d) 5.75 km/hr
3. A boat moves with a speed of 11 km/hr along the stream and 7 km/hr. against the stream. The rate of the stream is—
(a) 1 km/hr (b) 1.5 km/hr
(c) 2 km/hr (d) 2.5 km/hr
4. A man rows upstream 11 and downstream 26 km taking 5 hours each time. The velocity of the current is—
(a) 1 km/hr (b) 1.3 km/hr
(c) 1.5 km/hr (d) 25 km/hr
5. A man can row 4.5 km/hr in still water and he finds that it takes him twice as long river. Find the rate of stream.
(a) 2 km/hr (b) 1.5 km/hr
(c) 2.5 km/hr (d) 1.75 km/hr
6. The speed of a boat in still water is 15 km/hr and the rate of current is 3 km/hr. The distance travelled downstream in 12 minutes is
(a) 3.6 km (b) 2.4 km
(c) 1.2 km (d) 1.8
7. Speed of a boat in still water is 7 km/hr and the speed of the stream is 1.5 km/hr. A distance of 7.7 km, going upstream is covered in
(a) 1 hr 15 min
(b) 1 hr 12 min
(c) 1 hr 24 min
(d) 2 hr 6 min
8. A boat travels upstream from B to A and downstream from A to B in 3 hours. If the speed of the boat in still water is 9 km/hr and the speed of the current is 3 km/hr, the distance between A and B (in km) is
(a) 4 (b) 6
(c) 8 (d) 12
9. In a stream running at 2 km/hr, a motorboat goes 12 km upstream and back again to the starting point in 2.5 hours. Find the speed of the motorboat in still water.
(a) 15 km/hr (b) 12 km/hr
(c) 10 km/hr (d) 9 km/hr
10. A man can row 45 km upstream and 66 km downstream in 15 hrs. Also, he can row 65 km upstream and 77 km downstream in 20 hrs. Find the speed of the man in still water and rate of the current.
(a) 8 km/hr, 3 km/hr
(b) 11 km/hr, 3 km/hr
(c) 11 km/hr, 8 km/hr
(d) 9 km/hr, 2 km/hr
11. Two boats A and B start towards each other from two places 108 km apart. Speed of the boat A and B in still water 12 km/hr. and 15 km/hr respectively. If A proceeds down and B up the stream they will meet after.
(a) 4.5 hours (b) 4 hours
(c) 5.4 hours (d) 6 hours
12. A man goes downstream with a boat to some destination and returns upstream to his original place in 5 hours. If the speed of the boat in still water and the speed of stream are 10 km/hr and 4 km/hr respectively. The distance of the destination from the starting place is:
(a) 16 km (b) 18 km
(c) 21 km (d) 25 km
13. A motorboat went downstream for 28 km and immediately re-turned. It took the boat twice as long to make the return trip. If the speed of the river flow were twice as high, the trip downstream and back would take 672 minutes. Find the speed of the boat in still water and the speed of the river flow :
(a) 9 km/h, 3 km/h
(b) 9 km/h, 6 km/h
(c) 8 km/h, 2 km/h
(d) 12 km/h, 3 km/h
14. A boat sails downstream from point A to point B, which is 10 km away from A, and then returns to A. If the actual speed of the boat (in still water) is 3 km/h, the trip from A to B takes 8 hours less than that from B to A. What must be the actual speed of the boat for the trip from A to B to take exactly 100 minutes?
(a) 1 km/h (b) 2 km/h
(c) 3 km/h (d) 4 km/h
15. In a stream, B lies in between A and C such that it is equidistant from both A and C. A boat can go from A to B and back in 6 h 30 minutes while it goes from A to C in 9h. How long would it take to go from C to A?
(a) 3.75 h (b) 4 h
(c) 4.25 h (d) 4.5 h
16. P, Q and R are the three towns on a river which flows uniformly. Q is equidistant from P and R. Rakesh Yadav can row from P to Q and back in 10 hours and he can row from P to R in 4 hours. Compare the speed of his boat in still water with that of the river ?
(a) 5 : 3 (b) 4 : 3
(c) 6 : 5 (d) 7 : 3
17. Two swimmers started simultaneously from the beach, one to the south and the other to the East. Two hours later, the



- distance between them turned out to be 100 km. Find the speed of the faster swimmer, knowing that the speed of one of them was 75 % of the speed of the other:
- (a) 30 kmph (b) 40 kmph
(c) 45 kmph (d) 60 kmph
18. Two ghats are located on a riverbank and are 21 km apart. Leaving one of the ghats for the other, a motorboat returns to the first ghat in 270 minutes, spending 40 min of that time in taking the passengers at the second ghat. Find the speed of the boat in still water if the speed of the river flow is 2.5 km/h?
- (a) 10.4 km/h
(b) 12.5 km/h
(c) 22.5 km/h
(d) 11.5 km/h
19. Two friends A and B, on their last day in college, decided to meet after 20 years on a river. A had to sail 42 km to the meeting place and B had to sail $35\frac{5}{7}$ percent less to arrive at the meeting place at the same time as his friend B, A started at the same time as B and sailed with the speed exceeding by 5 km/h the speed of B. Find the speed of A :
- (a) 10 kmph (b) 14 kmph
(c) 9 kmph (d) Both b and c
20. On the banks of the river Yamuna there are two bathing points in Varanasi and Patna. A diya left in the river at Varanasi reaches Patna in 24 hours. However, a motorboat covers the whole way to and fro in exactly 10 hours. If the speed of the motorboat in still water is increased by 40% then it takes the motorboat 7 hours to cover the same way (from Varanasi to Patna and back again). Find the time necessary for the motorboat to sail from Varanasi to Patna when its speed in still water is not increased :
- (a) 3 hours (b) 4 hours
(c) 4.8 hours (d) None of these
21. A motorboat moves from point A to point B and back again, both points being located on the riverbank. If the speed of the boat in still water is doubled, then the trip from A to B and back again would take 20% of the time that the motorboat usually spends in the journey. How many times is their actual speed of the motorboat higher than the speed of the river flow ?
- (a) $\sqrt{\frac{3}{2}}$ (b) $\sqrt{\frac{2}{3}}$
(c) $\frac{2}{3}$ (d) $\frac{3}{2}$
22. The normal speed of a boat in still water is 4 times the speed of the river. The boat goes upstream and takes 2 hrs to reach B from A. By what percent should the boat increase/decrease its speed if it is required to reach A from B in exactly 1 hr 30 minutes ?
- (a) increase by 20 %
(b) increase by 25 %
(c) decrease by 20 %
(d) decrease by 25%
23. Rakesh Yadav can cross a downstream river by steamer in 40 minutes and same by boat in 1 hour. If the time of crossing the river in upstream direction by steamer is 50% more than downstream time by the steamer and the time required by boat to cross the same river by boat in upstream is 50% more than the time required in downstream by boat. What is the time taken by him to cross the river downstream by steamer and then return to same place by boat half the way and by steamer the rest of the way ?
- (a) 85 min (b) 115 min
(c) 120 min (d) 125 min
24. Two boats start at the same instant to cross a river W metre wide. The faster boat reaches the other bank and returns immediately. What are the distances travelled by them when they meet, the speeds of these boats are b_1 & b_2 ?
- (a) $\frac{2W}{(b_1+b_2)}, \frac{2W}{(b_1-b_2)}$
(b) $\frac{2W}{(b_1+b_2)}b_1$ and $\frac{2W}{(b_1+b_2)}b_2$
(c) $\frac{2W}{(b_1+b_2)}b_2$
(d) data insufficient
25. Bhuvnesh was travelling in his boat when the wind blew his hat off and the hat started floating back downstream. The boat continued to travel upstream for twelve more minutes before Bhuvnesh realized that his hat had fallen off and turned back downstream. He caught up with that as soon as it reached the starting point. Find the speed of the river if Bhuvnesh's hat flew off exactly 3 km from where he started:
- (a) 5 km/h (b) 6 km/h
(c) 7.5 km/h
(d) can't be determined
26. Two men P and Q start swimming towards each other from the deep end and shallow end respectively of a swimming pool in a function. They start their swimming simultaneously in the length of 300 m pool. The ratio of their speeds is 1 : 2 respectively. Each swimmer rests for 6 seconds once he reaches the



other end and starts swimming back. Where will they meet for the second time in the still water of swimming pool?

- (a) 30 m from the shallow end
 - (b) at the shallow end
 - (c) at the deep end
 - (d) can't be determined
27. A boat rows downstream 7 km in 35 minutes and upstream 2 km in 30 minutes. What is the speed of boat in still water and also find the speed of stream?
- (a) 8 km/h, 4 km/h
 - (b) 12 km/h, 4 km/h
 - (c) 8 km/h, 6 km/h
 - (d) none of these
28. The speed of a boat in still water is 9 km/h. A boat goes 72 km and back to its starting point in 18 hours. Find the speed of the stream?
- (a) 3 km/hr
 - (b) 4 km/hr
 - (c) 5 km/hr
 - (d) 6 km/hr
29. A boat rows downstream 68 km and upstream 45 km in 9 hours. The same boat rows 51 km downstream and 72 km upstream takes 2 hours more. Find the rate of current and the speed of the boat in still water :
- (a) 13 km/h, 4 km/h
 - (b) 12 km/h, 4 km/h

- (c) 17 km/h, 9 km/h
- (d) none of these

30. The ratio of time taken by a boat to row a certain distance downstream and upstream is 3 : 5. If the speed of the current

is $3\frac{3}{4}$ km/hr then what is the speed of boat in still water ?

- (a) 15 km/h
 - (b) 9 km/hr
 - (c) 25 km/hr
 - (d) none of these
31. A boat goes 60 km and back to starting point in 10 hours. The time taken by the boat to row 3 km downstream is equal to the time taken by the boat to row 2 km upstream. Find the speed of boat in still water and the rate of current :
- (a) 12.5 km/hr, 2.5 km/hr
 - (b) 15 km/hr, 10 km/hr
 - (c) 15 km/hr, 12 km/hr
 - (d) none of these
32. A sailor in river takes a boat from place A to place B, and returns to A. Place A and B are 21 km apart. And he takes 10 hours to go and return. The time taken by the boat to row 7 km downstream is equal to the time taken by the boat to row 3 km upstream. Then what is the speed of the current?
- (a) 5 km/hr
 - (b) 2 km/hr
 - (c) 7.5 km/hr
 - (d) none of these
33. In the river Yamuna the dis-

tance between two points is 80 km. A boat which rows at 13 km/h in still water goes from the first point to the second and returns to starting point in 13 hours. Then what is the speed of the current?

- (a) 5 km/hr
- (b) 2 km/hr
- (c) 3 km/hr
- (d) none of these

34. A boat can row 66 km downstream and 56 upstream in 7 hours. And it can row 88 km downstream and 28 km upstream in 6 hours. Then find the time taken by boat to row 72 km in still water, and also find if a paper boat put in the stream, then how far away it will be after 1 hour 30 minutes?

- (a) 4 hrs, 6 km
- (b) 12 hrs, 4 km
- (c) 16 hrs, 25 km
- (d) none of these

35. The speed of 20 m long motor boat in still water is 40 km/h. This motor boat is moving in the river whose speed is 4 km/h. Travelling in the upstream it crosses a temple situated at bank of the river in 10 seconds. Then find the length of the temple :

- (a) 80 m
- (b) 100 m
- (c) 160 m
- (d) 220 m

ANSWER KEY

- | | | | | | | | | |
|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| 1. (c) | 5. (b) | 9. (c) | 13. (a) | 17. (b) | 21. (a) | 25. (c) | 29. (a) | 33. (c) |
| 2. (b) | 6. (a) | 10. (a) | 14. (d) | 18. (d) | 22. (c) | 26. (b) | 30. (a) | 34. (a) |
| 3. (c) | 7. (c) | 11. (b) | 15. (b) | 19. (b) | 23. (b) | 27. (a) | 31. (a) | 35. (a) |
| 4. (c) | 8. (d) | 12. (c) | 16. (a) | 20. (b) | 24. (b) | 28. (a) | 32. (b) | |

Solution

1. (c) According to the question,

$$S_B = 2 \text{ km/hr}$$

$$S_B - V_s = 1 \text{ km/hr}$$

Hence we get,

$$2 - V_s = 1$$

$$V_s = 1 \text{ km/hr.}$$

2. (b) $S_B = 10 \text{ km/hr}$

$$S_B + V_s = 13 \text{ km/hr}$$

$$V_s = 13 - 10 = 3 \text{ km/hr}$$

3. (c) According to the questions

$$\text{Down stream speed } (S_B + V_s)$$

$$= 11 \text{ km/hr}$$

and

$$\text{Up stream speed } (S_B - V_s) = 7 \text{ km/hr}$$

$$S_B = 9 \text{ km/hr}$$

$$V_s = \frac{11-7}{2} = \frac{4}{2} = 2 \text{ km/hr.}$$

4. (c) According to the question,

$$\text{upstream} \rightarrow S_B - V_s = \frac{11}{5} \text{ km/hr}$$

$$= 2.2 \text{ km/hr}$$

$$\text{Downstream} \rightarrow S_B + V_s$$

$$= \frac{26}{5} \text{ km/hr} \Rightarrow 5.2 \text{ km/hr}$$

$$V_s = \frac{5.2-2.2}{2} = \frac{3}{2} = 1.5 \text{ km/hr}$$

5. (b)

	DS		US
Time	1	:	2
Speed	2	:	1

Therefore

$$\frac{S_B}{2+1} : \frac{V_B}{(2-1)}$$

$$\Rightarrow 3 : 1$$

$$\text{Hence } \frac{4.5}{V_s} = \frac{3}{1}$$

$$\Rightarrow V_s = \frac{4.5 \times 1}{3} = 1.5 \text{ km/hr.}$$

6. (a) According to the question,

$$\text{Speed of boat} \rightarrow S_B = 15 \text{ km/hr}$$

$$\text{Velocity of the stream} \rightarrow V_s$$

$$= 3 \text{ km/hr}$$

$$\text{Down stream speed} = S_B + V_s = 18 \text{ km/hr}$$

Distance travelled in 12 minutes

$$\text{in Downstream} = \frac{18}{60} \times 12 = 3.6 \text{ km}$$

7. (c) According to the question,

$$S_B = 7 \text{ km/hr}$$

$$V_s = 1.5 \text{ km/hr}$$

$$\text{Upstream speed} = 7 - 1.5 = 5.5 \text{ km/hr}$$

Now, the required time to cover the Distance of 7.7 km in upstream

$$= \frac{7.7}{5.5} = \frac{7}{5} \text{ hr.}$$

$$\Rightarrow \frac{7}{5} \times 60 \Rightarrow 84 \text{ min}$$

$$\Rightarrow 1 \text{ hr. } 24 \text{ min}$$

8. (d) According to the question,

$$\text{Downstream speed} = 9 + 3$$

$$= 12 \text{ km/hr.}$$

$$\text{Upstream speed} = 9 - 3 = 6 \text{ km/hr}$$

Now, Here we have

$$\frac{D}{12} + \frac{D}{6} = 3$$

Now,

$$\frac{D+2D}{12} = 3$$

$$D = 12 \text{ km}$$

9. (c) Given Information

$$V_s = 2 \text{ km/h}$$

$$D = 12 \text{ km}$$

$$T = 2.5 \text{ hrs.}$$

According to the question

$$\frac{12}{(a+2)} + \frac{12}{(a-2)} = 2.5$$

Solving above equation, we get

$$S_B = 10 \text{ km/hr.}$$

10. (a) According to the question

$$\frac{45}{(S_B - V_s)} + \frac{66}{(S_B + V_s)} = 15 \text{ hrs.}$$

Also,

$$\frac{65}{S_B - V_s} + \frac{77}{S_B + V_s} = 20 \text{ hrs.}$$

$$\text{Now suppose } \frac{1}{(S_B - V_s)} = a$$

$$\text{and } \frac{1}{S_B + V_s} = b$$

then

$$45a + 66b = 15 \text{ -----(i)}$$

$$65a + 77b = 20 \text{ -----(ii)}$$

Solving the two equations we get

$$a = \frac{1}{5} \therefore S_B - V_s = 5 \text{ km/hr}$$

$$b = \frac{1}{11} \therefore S_B + V_s = 11 \text{ km/hr}$$

$$\text{Now, } S_B = \frac{11+5}{2} = 8 \text{ km/hr.}$$

$$V_s = \frac{11-5}{2} = 3 \text{ km/hr.}$$

Note: If you go through the options you can solve the Question easily.

11. (b) According to the question

Let the speed of stream

$$= x \text{ km/hr}$$

Since Boat A is moving downstream with 12 km/hr.

$$\text{Speed of boat A} = (12 + x) \text{ km/hr.}$$

Since Boat B is moving upstream with 15 km/h.

$$\text{Speed of boat B} = (15 - x) \text{ km}$$

Relative speed of A and B

$$= 12 + x + 15 - x = 27 \text{ km/hr.}$$

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}} = \frac{108}{27}$$

$$= 4 \text{ hour.}$$

12. (c) According to the question

$$\text{Speed of the Boat in still water} = 10 \text{ km/hr}$$

$$\text{Speed of stream} = 4 \text{ km/hr.}$$

$$\text{downstream speed} = 10 + 4 = 14 \text{ km/hr.}$$

$$\& \text{ upstream speed} = 10 - 4 = 6 \text{ km/hr.}$$

Let Distance D km

$$\frac{D}{14} + \frac{D}{6} = 5 \text{ hr.}$$

$$\frac{3D+7D}{42} = 5$$

$$10D = 5 \times 42$$

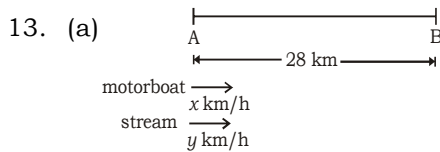
$$D = \frac{5 \times 42}{10} = 21$$

$$D = 21 \text{ km}$$

Alternate

$$T = \frac{2x D}{x^2 - y^2}$$

$$D = \frac{(10^2 - 4^2) \times 5}{2 \times 10} = \frac{84 \times 5}{2 \times 10} = 21 \text{ km}$$



Let the speed of motorboat and stream is x km/h and y km/h respectively.

from question,

Condition(i),

$$2\left(\frac{28}{x+y}\right) = \frac{28}{x-y}$$

$$2x - 2y = x + y$$

$$x = 3y$$

Condition(ii)

When the speed of the stream is doubled

$$\frac{28}{x+2y} + \frac{28}{x-2y} = \frac{672}{60}$$

$$[\text{put } x = 3y]$$

$$\frac{28}{5y} + \frac{28}{y} = \frac{672}{60}$$

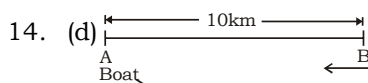
$$\frac{1}{5y} + \frac{1}{y} = \frac{24}{60}$$

$$\frac{1+5}{5y} = \frac{2}{5} \Rightarrow y = 3 \text{ km/h}$$

$$x = 9 \text{ km/h}$$

Alternate

Check condition (i) and we get $x = 3y$. Then the speed of motorboat is thrice the speed of stream. Then check options and hence option (a) is correct.



Let the speed of stream
= y km/h

Now from question,

Condition (i), $\frac{10}{3-y} - \frac{10}{3+y} = 8$

$$\frac{10(3+y-3+y)}{9-y^2} = 8$$

$$\Rightarrow 20y = 72 - 8y^2$$

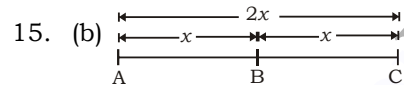
$$8y^2 + 20y - 72 = 0$$

after solving $y = 2$ km/h

Condition (ii) : Now to complete trip from A to B in 100 minutes

$$(x+y) = \frac{10}{100} \times 60 = 6 \text{ km/h}$$

$$x+2=6 \Rightarrow x=4 \text{ km/h}$$



Let the total distance between A and C is $2x$ km, and B is the mid point of A and C.

So $AB = BC = x$ km

From question : (i) Time taken from A to C ($2x$ km)

$$2x = 9 \text{ hours}$$

$$\Rightarrow x = 4 \text{ hours } 30 \text{ mins}$$

(ii) Time taken from A to B and return to A ($2x$ km) = 6 hours 30 mins

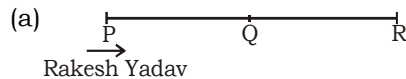
from (i)- Time taken in return

$$= 6\frac{1}{2} - 4\frac{1}{2} = 2 \text{ hours}$$

Time taken to return from C to A

$$= 2 \times 2 = 4 \text{ hours}$$

16.



According to the question,

$$PQ = QR$$

time taken by Rakesh Yadav to row from P to R

$$= 4 \text{ hours}$$

time taken by Rakesh Yadav to row from P to Q

$$= \frac{4}{2} = 2 \text{ hours}$$

time taken by Rakesh Yadav in

returning from Q to P

$$= (10-2) = 8 \text{ hours}$$

downstream time = 2 hours

upstream time = 8 hours

$\therefore$ downstream speed

$$= 8 \text{ km/hr}$$

upstream speed = 2 km/hr

speed of boat in still water

as speed $\propto \frac{1}{\text{time}}$

$$= \frac{1}{2} (8+2) = 5 \text{ km/hr}$$

$$\text{speed of current} = \frac{1}{2} (8-2)$$

$$= 3 \text{ km/hr}$$

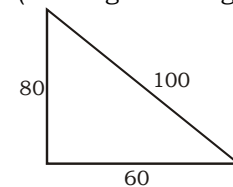
$$\text{Ratio} = 5 : 3$$

17. (b) The following figure gives the movements the two swimmers.

The faster swimmer must have travelled 80 km in 2 hours and hence speed(S)

$$= \frac{80}{2} = 40 \text{ km/h}$$

(Use right triangle concept)



Alternate

Speed of faster swimmer

$$= x \text{ km/hr}$$

speed of slower swimmer

$$= \frac{3}{4} x \text{ km/hr}$$

distance covered by faster swimmer = $2x$

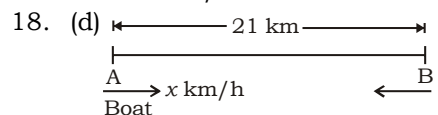
distance covered by slower swimmer

$$= \frac{3}{2} x$$

According to the question,

$$\sqrt{4x^2 + \frac{9}{4}x^2} = 100$$

$$x = 40 \text{ km/hr}$$



Let the speed of the boat is x km/h in still water.
from question :

$$\frac{21}{(x+2.5)} + \frac{21}{(x-2.5)} = \frac{230}{60}$$

Now help from option put x
= 11.5 km/h, then both sides will be equal so option (d) is correct.
Speed of the boat in still water
= 1.5 km/h

19. (b) Let the speed of B = x km/h
Then the speed of A = $(x + 5)$ km/h

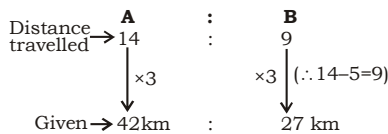
∴ Distance travelled by A to meet his friend = 42 km

from question-

Distance travelled by B

$$= 35\frac{5}{7} \% \text{ less}$$

$$= \frac{5}{14} \left[\therefore \frac{250}{7 \times 100} = \frac{5}{14} \right]$$



Now from question → Time is given equal-

$$\therefore \frac{42}{x+5} = \frac{27}{x} \quad \dots (i)$$

Now help from option,

$x = 9$ km/h

Speed of A = $9 + 5 = 14$ km/h

20. (b)
 Varanasi ————— Patna
 Let the distance between Varanasi and Patna be d km,

and the speed of the boat in still water is x km/h and the speed of stream is y km/h.

From question,

Condition : (i) : Diya will move at a speed of stream.

$$24 = \frac{d}{y} \Rightarrow d = 24 y \text{ km} \dots (i)$$

$$\text{Condition : (ii)} : \frac{24y}{x+y} + \frac{24y}{x-y} = 10 \quad \dots (ii)$$

Condition : (iii) :

When speed of boat increases 40%

$$\therefore \frac{24y}{\frac{7}{5}x+y} + \frac{24y}{\frac{7}{5}x-y} = 7 \dots (iii)$$

After solving equation (ii) & (iii) we get $x = 5y$

Now time taken to sail from Varanasi to Patna.

$$t = \frac{24y}{6y} = 4 \text{ hours}$$

$$t = 4 \text{ hours}$$

21. (a)
 A ————— B
 d km

Let the distance between two points A and B be d km. And the speed of the motorboat in still water be x km/h and the speed of stream be y km/h.

From question :

$$\text{Condition (i)} : \frac{d}{(x+y)} + \frac{d}{(x-y)} = 5 \quad \dots (i)$$

$$\left[\begin{array}{l} \therefore 20\% = \frac{1}{5} \\ \text{original time} \rightarrow 5 \\ \text{new time} \rightarrow 1 \end{array} \right]$$

Condition (ii) :

When speed of boat is doubled

$$\frac{d}{(2x+y)} + \frac{d}{(2x-y)} = 1 \quad \dots (ii)$$

Now from equation (i) & (ii) :

From (i) : $d[x + y + x - y] = 5(x^2 - y^2)$

$$d = \frac{5(x^2 - y^2)}{2x}$$

From (ii) $d[2x + y + 2x - y] = 4x^2 - y^2$

$$d = \frac{4x^2 - y^2}{4x} \quad \dots (iv)$$

Distance would be equal in both the cases :

$$\frac{5(x^2 - y^2)}{2x} = \frac{4x^2 - y^2}{4x}$$

$$10x^2 - 10y^2 = 4x^2 - y^2$$

$$6x^2 = 9y^2$$

$$\frac{x^2}{y^2} = \frac{9}{6} \Rightarrow \frac{x^2}{y^2} = \frac{3}{2}$$

$$\frac{x}{y} = \sqrt{\frac{3}{2}}$$

22. (c) River : Boat

Speed $\rightarrow v : 4v$

upstream speed = $(4v - v) = 3v$

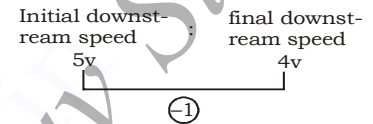
distance = $t \times v = 3v \times 2 = 6v$ km

Downstream speed = $5v$

downstream Speed to reach

from A to B = $\frac{\text{Distance}}{\text{Time}}$

$$= \frac{6v}{\left(1 + \frac{1}{2}\right)} = 4v \text{ km/h}$$



$$\% \text{ decrease} = \frac{5v - 4v}{5v} \times 100 = 20\%$$

⇒ He should decrease his speed by 20%

23. (b) Downstream (steamer) = 40 min

Downstream (Boat) = 60 min

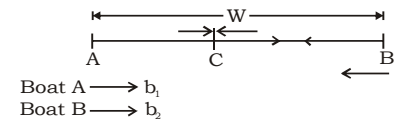
Upstream (Steamer)

$$= 40 \times \frac{150}{100} = 60 \text{ min}$$

$$\text{Upstream (Boat)} = 60 \times \frac{150}{100} = 90 \text{ min}$$

$$\text{Required time} = 40 + 45 + 30 = 115 \text{ min.}$$

24. (b)



Let AB is river which is W metre wide and b_1 and b_2 are the speeds of the boat A and boat B respectively. C is a point where both the boats meet.

then total time

$$= \frac{\text{Total distance}}{\text{Relative Speed}} = \frac{2W}{b_1 + b_2}$$

Distance travelled by the boat A (d_1)

$$= \left(\frac{2W}{b_1 + b_2} \right) b_1$$

Distance travelled by the boat B (d_2)

$$= \left(\frac{2W}{b_1 + b_2} \right) b_2$$

25. (c) Let the speed of the boat be x km/hr and the speed of the river be y km/hr.

Downstream speed = $(x + y)$

Upstream speed = $(x - y)$

In 12 minutes the distance between boat and hat

$$= 12(x - y) + 12y = 12x$$

The speed of hat is y because it doesn't have its own speed, it travels with the speed of current.

Now time taken by boat to reach to

$$\text{the hat} = \frac{12x}{(x+y)-y}$$

$$= 12 \text{ min}$$

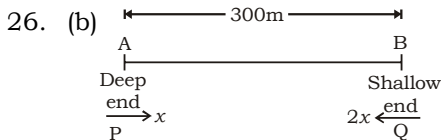
Total time = $12 + 12 = 24$ min

According to the question,

In 24 minutes hat flown off
= 3km

$$\text{Speed of river (y)} = \frac{3}{24} \times 60$$

$$= 7.5 \text{ km/h}$$



time taken by P to reach B

$$= \frac{300}{x} + 6$$

Since both rest for 6 seconds so when Q is just about to start the journey P reaches there at the shallow end so they will meet at the shallow end.

27. (a) Downstream speed (u)

$$= \frac{D}{T} = \frac{7}{35} \times 60 = 12 \text{ km/h}$$

$$\text{upstream speed (v)} = \frac{D}{T}$$

$$= \frac{2}{30} \times 60 = 4 \text{ km/h}$$

Speed of boat in still water

$$= \frac{1}{2}(u+v) = \frac{1}{2}(12 + 4) = 8 \text{ km/h}$$

$$\text{Speed of stream} = \frac{1}{2}(u-v)$$

$$= \frac{1}{2}(12 - 4) = 4 \text{ km/h}$$

28. (a) Let the speed of stream = x km/h

Speed of boat in still water = 9 km/h (given)

$$\text{We know} \rightarrow T = \frac{D}{V}$$

$$\text{from question} \rightarrow \frac{72}{9+x} + \frac{72}{9-x}$$

$$= 18 \dots (i)$$

Note: (i) $(9 + x)$ shows the downstream speed

$(9 - x)$ shows the upstream speed

Note : (ii) In such equations take help from options or other way is to make two factors of

$$72 \begin{matrix} \swarrow & \searrow \\ \boxed{\begin{matrix} 12 \\ \times \\ 6 \end{matrix}} & \boxed{\begin{matrix} 9 \\ \times \\ 8 \end{matrix}} \\ \text{(I)} & \text{(II)} \end{matrix} \text{ whose sum}$$

is so (I) is correct and (II) is wrong. To make satisfy equation (i) we need $x = 3$ so speed of stream = 3 km/h

29. (a) Let speed of boat in still water = x km/h

Let speed of current/stream = y km/h

Downstream speed

$$= (x + y) \text{ km/h,}$$

$$\text{Upstream speed} = (x - y) \text{ km/h}$$

$$\text{From question, } \frac{68}{x+y} + \frac{45}{x-y} = 9 \dots (i)$$

$$\frac{51}{x+y} + \frac{72}{x-y} = 11 \dots (ii)$$

$$[\therefore 2 \text{ hours more} = 2 + 9$$

$$= 11 \text{ hours}]$$

Note : first way to solve question is use options to save your valuable time or in other way take common values in $(68, 51)$

$$\begin{matrix} 68 & 51 \\ & \swarrow \searrow \\ & 17 \\ \text{and } (45, 72) & \text{is as possible} \\ & \swarrow \searrow \\ & 9 \end{matrix}$$

which can satisfy the equation, put $x + y = 17$ and

$x - y = 9$ then $x = 13$ km/h, $y = 4$ km/h.

30. (a) from question,

	Downstream	Upstream
Time $\rightarrow$	3k	5k
Speed $\rightarrow$	5k	3k
Time (T) $\propto$	$\frac{1}{\text{Speed}}$	

$$\text{Speed of current} = \frac{1}{2}$$

[downstream speed - upstream speed]

$$= \frac{1}{2} [5 - 3]K = 1k \text{ (unit)}$$

Speed of Boat in still water

$$= \frac{1}{2} [5 + 3]K = 4k \text{ (units)}$$

$$\text{from question, } 1k \rightarrow \frac{15}{4}$$

$$k \rightarrow \frac{15}{4}, \text{ then } 4k = 4 \times \frac{15}{4}$$

$$= 15 \text{ km/h}$$

31. (a) Speed of boat in still water = x km/h and current = y km/h
downstream speed

$$= (x + y) \text{ km/h,}$$

$$\text{upstream speed } (x - y) \text{ km/h}$$

$$\text{Condition (i) : } \frac{60}{x+y} + \frac{60}{x-y} = 10$$

$$\dots (i)$$

$$\text{Condition (ii) : } \frac{3}{x+y} = \frac{2}{x-y}$$

$$\Rightarrow 3(x - y) = 2(x + y)$$

$$\Rightarrow \frac{x+y}{x-y} = \frac{3}{2}$$

assume $(x + y) = 3k$, $(x - y) = 2k$

put values in equation (i)

$$\frac{60}{3k} + \frac{60}{2k} = 10$$

$$\Rightarrow k = 5 \text{ then } x + y = 15, (x - y) = 10$$

speed of boat in still water =

$$\frac{1}{2}(15+10)$$

$$= 12.5 \text{ km/h}$$

$$\text{speed of current} = \frac{1}{2} (15 - 10)$$

$$= 2.5 \text{ km/h}$$

32. (b) Let speed of boat = x km./hr
 speed of current = y km/hr
 Downstream speed = $(x + y)$,
 upstream speed = $(x - y)$

Condition (i) : $\frac{21}{x+y} + \frac{21}{x-y}$

= 10(i)

Condition (ii) : $\frac{7}{x+y} = \frac{3}{x-y}$

$\Rightarrow \frac{x+y}{x-y} = \frac{7}{3}$, assume $x + y = 7$

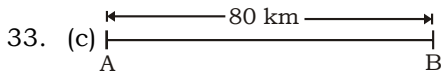
k, $(x - y) = 3k$, put values in eq. (i)

then, $k = 1$, $x + y = 7$, $x - y = 3$

Speed of boat = $\frac{7+3}{2} = 5$ km/h

Speed of current = $\frac{7-3}{2} = 2$

km/h



Let speed of current = y km/h,

Speed of boat in still water
 = 13 km/h (given)

Downstream speed = $(13 + y)$,

Upstream speed = $(13 - y)$

From question,

$\frac{80}{13+y} + \frac{80}{13-y} = 13$ (i)

Note : Take help from options.
 Choose the option which satisfy
 the equation (i). put $y = 3$

so, speed of stream/current
 = 3 km/h

34. (a) Let speed of boat is still wa-
 ter = x km/h, speed of stream
 = y km/h

downstream speed = $(x + y)$ km/
 h, upstream speed
 = $(x - y)$ km/h

from question - $\frac{66}{x+y} + \frac{56}{x-y} = 7$
(i)

$\frac{88}{x+y} + \frac{28}{x-y} = 6$ (ii)

(i) & (ii) $\rightarrow$ see common factor

Note : I have explained the way how
 to check common factor in ear-
 lier questions.

$x + y = 22$,

$x - y = 14$

from equation, $x = 18$ km/h, y
 = 4 km/h

- (i) Time taken by boat to travel 72

km in still water = $\frac{72}{18} = 4$ h

- (ii) A paper boat is put in stream
 then we should know paper
 boat don't have its own speed it
 will move by the speed of
 stream. Distance travelled by

boat in (1 h + 30 min) = $4 \times \frac{3}{2}$
 = 6 km

35. (a) Length of temple = l m

Length of boat = 20 m

Speed of boat in still water

= 40 km/h

Speed of stream

= 4 km/h (Given)

Upstream speed = $(40 - 4)$

= 36 km/h

from question, $t = \frac{D}{V} \Rightarrow 10 =$

$\frac{(l+20) \times 18}{36 \times 5}$

$l + 20 = 100 \Rightarrow l = 80$ m

Note: To cross the temple the boat
 will travel the distance = length
 of boat + length of temple





14

LCM & HCF

(LOWEST COMMON MULTIPLE & HIGHEST COMMON FACTOR)

IMPORTANT FORMULAS

1. Factors and Multiples

If a number 'a' is divided another number 'b' exactly, we say that 'a' is a factor of 'b'. In this case, 'b' is called a multiple of 'a'.

2. Highest Common Factor (HCF) or Greatest Common Measure (G.C.M.) or Greatest Common Divisor (G.C.D)

The HCF of two or more than two numbers is the greatest number that divides each of them exactly.

There are two methods of finding the HCF of a given set of numbers.

I. Factorization Method: Express the each one of the given number as the product of prime factors. The product of least powers of common prime factors gives HCF.

II. Division Method: Suppose we have to find the HCF of two given numbers, divide the larger by the smaller one. Now, divide the divisor by the remainder. Repeat the process of dividing the preceding number by the remainder last obtained till zero is obtained as remainder. The last divisor is required HCF.

Finding the HCF of more than two numbers: Suppose we have to find the HCF of three numbers, then, HCF of [(HCF of any two) and (the third number)] gives the HCF of three given number.

Similarly, the HCF of more than three numbers may be obtained.

3. Least Common Multiple (LCM):

The least number which is exactly divisible by each one of the given number is called their LCM.

There are two methods of finding the LCM of a given set of numbers:

I. Factorization Method: Resolve each one of the given number into a product of prime factors. Then, LCM is the product of highest powers of all the factors.

II. Division Method (short-cut): Arrange the given numbers in a row in any order. Divide by a number which divided exactly at least two of the given numbers and carry forward the numbers which are not divisible. Repeat the above process till no two of the numbers are divisible by the same number except first The product of the divisors and the undivided numbers is the required LCM of the given numbers.

4. Product of two numbers = Product of their HCF and LCM

5. Co-primes: Two numbers are said to be co-primes if their HCF is 1.

6. HCF and LCM of Fractions:

$$1. \text{HCF} = \frac{\text{H.C.F. of Numerators}}{\text{L.C.M. of Denominators}}$$

$$2. \text{LCM} = \frac{\text{L.C.M. of Numerators}}{\text{H.C.F. of Denominators}}$$

7. HCF and LCM of Decimal Fractions:

In a given numbers, make the same number of decimal places by annexing zeros in some numbers, if necessary. Considering these number to decimal point, find HCF or LCM as the case may be.

Now, in the result, mark off as many decimal places as are there in each of the given numbers.

8. Comparison of Fractions

Find the LCM of the denominators of the given fractions, Convert each of the fractions into an equivalent fraction with LCM as the denominator, by multiplying both the numerator and denominator by the same number. The resultant fraction with the greatest numerator is the greatest.

EXAMPLES

1. Find the greatest weight which can be contained exactly in 6 kg 7 hg 4 dg 3g and 9 kg 9 dg 7 g.

- (a) 11 g (b) 27 g
(c) 12 g (d) 17 g

Sol. (a) 6kg 7hg 4dg 3g = 6000g + 700g + 40g + 3g = 6743g

9kg 9dg 7g
= 9000 + 90 g + 7g
= 9097g

HCF of 6743g 9097g

$$\begin{array}{c} \swarrow \searrow \\ 2354 = 11 \times 214 \end{array}$$

11 g is the greatest weight that can be contained exactly in 6743 g and 9097g

2. Find the greatest measure which is exactly contained in 10 litres 857 millilitres and 15 litres 87 millilitres.

- (a) 140 ml (b) 138 ml
(c) 141 ml (d) 142 ml

Sol. (c) 1 litre = 1000 millilitres

$$\begin{array}{c} 10857 \quad 15087 \\ \swarrow \searrow \\ (4230) \text{ (difference)} \end{array}$$



Now, HCF will be the factor of this number

$$4230 = 141 \times 30$$

∴ Greatest number will be 141 ml (check through options)

3. A man bought a certain number of mangoes Rs. 14.40, he gained 44P by selling some of them for Rs. 8. Find at least how much mangoes he had left with.

- (a) 19 (b) 36
(c) 38 (d) 21

Sol. (a) Cost price of all the mangoes = ₹ 14.40

& cost price of sold mangoes

$$= 8 - 0.44 = ₹ 7.56 = 756 \text{ p.}$$

Now, HCF of 1440 & 756 = 36p

Therefore, least number of mangoes he had left

$$= \frac{(1440 - 756)}{36} = 19$$

4. Find the LCM of 40, 36 and 126.

- (a) 2220 (b) 2520
(c) 2624 (d) 2020

Sol. (b) $40 = 2 \times 2 \times 2 \times 5 = 2^3 \times 5$

$$36 = 2 \times 2 \times 3 \times 3 = 2^2 \times 3^2$$

$$126 = 2 \times 3 \times 3 \times 7 = 2 \times 3^2 \times 7$$

To Calculate LCM, we take the highest power factors & the Remaining numbers.

∴ Required LCM

$$= 2^3 \times 3^2 \times 5 \times 7 = 2520$$

5. Find the LCM of 112, 140 and 168.

- (a) 1580 (b) 1680
(c) 1720 (d) 1600

Sol. (b) $112 = 2 \times 2 \times 2 \times 2 \times 7 = 2^4 \times 7$

$$140 = 2 \times 2 \times 5 \times 7 = 2^2 \times 5 \times 7$$

$$168 = 2 \times 2 \times 2 \times 3 \times 7 = 2^3 \times 3 \times 7$$

∴ Required LCM = $2^4 \times 3 \times 5 \times 7$
= 1680

6. Find the LCM of 2.4, 0.36 and 7.2.

- (a) 7.2 (b) 5.2
(c) 1.2 (d) 4.2

Sol. (a) To calculate the LCM of decimal integers, make the decimal integers into whole numbers multiplying with any friendly numbers i.e. 10, 100, 1000 ...etc.

Given

$$2.4, 0.36, 7.2$$

we multiply it by 100 to make whole number, we get

∴ 240, 36 & 720

Now,

$$\text{LCM of } 240, 36 \text{ \& } 720 = 720$$

∴ We multiply the numbers with 100, hence divide the LCM by 100 to get required LCM.

$$\therefore \text{LCM of } (2.4, 0.36 \text{ \& } 7.2) = \frac{720}{100} = 7.2$$

7. Find the LCM of 0.18, 2.4 and 60.

- (a) 360 (b) 240
(c) 180 (d) 720

Sol. (c) we can write

$$(0.18, 2.4, 60) \text{ as } 18, 240, 6000$$

$$\therefore \text{LCM of } 18, 240, 6000 = 18000$$

Hence LCM of 0.18, 2.4 and 60

$$= \frac{18000}{100} = 180$$

8. Find the LCM of 20, 2.8 and 0.25.

- (a) 700 (b) 140
(c) 600 (d) 1000

Sol. (b) we can write 20, 2.8 & 0.25 as 2000, 280 & 25

$$\text{LCM of } 2000, 280 \text{ \& } 25 = 14000$$

∴ LCM of 20, 2.8 & 0.25

$$= \frac{14000}{100} = 140$$

9. Find the HCF of $\frac{3}{4}$, $\frac{5}{6}$ and $\frac{6}{7}$.

- (a) $\frac{1}{84}$ (b) $\frac{1}{42}$
(c) $\frac{1}{21}$ (d) $\frac{5}{42}$

Sol. (a) HCF of fraction

$$= \frac{\text{HCF of numerators}}{\text{LCM of denominators}}$$

$$\text{HCF of } \left(\frac{3}{4}, \frac{5}{6}, \frac{6}{7}\right)$$

$$= \frac{\text{HCF } (3, 5, 6)}{\text{LCM } (4, 6, 7)} = \frac{1}{84}$$

10. Find the HCF of $\frac{6}{8}$, $2\frac{1}{2}$ and $\frac{15}{16}$.

- (a) $\frac{1}{31}$ (b) $\frac{1}{16}$

- (c) $\frac{15}{32}$ (d) $\frac{1}{15}$

Sol. (b) HCF $\frac{6}{8}, \frac{5}{2}, \frac{15}{16}$

$$= \frac{\text{HCF } (6, 5, 15)}{\text{LCM } (8, 2, 16)} = \frac{1}{16}$$

11. Find the LCM of $8\frac{16}{20}$ and $1\frac{3}{7}$.

- (a) 80 (b) 40

- (c) $\frac{1}{80}$ (d) $\frac{1}{20}$

Sol. (a) LCM $(8, \frac{16}{20}, \frac{10}{7})$

$$= \frac{\text{LCM } (8, 16, 10)}{\text{HCF } (1, 20, 7)} = 80$$

12. Find the LCM of $1\frac{37}{78}$, $2\frac{54}{65}$ and

$$5\frac{35}{39}.$$

- (a) $72\frac{10}{13}$ (b) $71\frac{10}{13}$

- (c) $\frac{921}{13}$ (d) $70\frac{10}{13}$

Sol. (d) LCM $\left(\frac{115}{78}, \frac{184}{65}, \frac{230}{39}\right)$

$$= \frac{\text{LCM } (115, 184, 230)}{\text{HCF } (78, 65, 39)} = \frac{920}{13}$$

$$= 70\frac{10}{13}$$



13. The LCM of two numbers is 64699, their GCM or (HCF) is 97 and one of the numbers is 2231. Find the other.

(a) 2183 (b) 2813
(c) 2831 (d) 2381

Sol. (b) Product of two numbers
= HCF $\times$ LCM

Let the other number be x

$$\therefore 2231 \times x = 97 \times 64699$$

$$x = \frac{97 \times 64699}{2231}$$

$$x = 2813$$

14. The HCF of two numbers each consisting of four digits is 103, and their LCM is 19261, find the number

(a) 1133, 1751 (b) 1313, 1571
(c) 1331, 1751 (d) 1133, 1715

Sol. (a) HCF of four digits number is 103

Hence, the number can be $103x$ and $103y$ where x and y are prime to each other

Now,

$$\text{First number} \times \text{second number} = \text{HCF} \times \text{LCM}$$

$$\Rightarrow 103x \times 103y = 103 \times 19261$$

$$\Rightarrow xy = \frac{103 \times 19261}{103 \times 103}$$

$$\Rightarrow xy = 187$$

The possible pairs of x and y , satisfying the condition

$$xy = 187 \text{ is } (17, 11)$$

$\therefore$ Two numbers

$$= 103 \times 17, 103 \times 11$$

$$= 1751, 1133$$

15. The HCF of two numbers is 99 and their LCM is 2772. The numbers are

(a) 198, 1386 (b) 198, 297
(c) 297, 495 (d) None of these

Sol. (d) The numbers can be $99x$ and $99y$, where x and y are prime to each other

now, first no. $\times$ second no.

$$= \text{HCF} \times \text{LCM}$$

$$\Rightarrow 99x \times 99y = 99 \times 2772$$

$$\Rightarrow xy = \frac{99 \times 2772}{99 \times 99}$$

$$xy = \frac{2772}{99}$$

$$xy = 28$$

The possible pairs of x and y . Satisfying the condition $xy = 28$ are (7, 4) and (1, 28)

$\therefore$ Two numbers

$$99 \times 7 = 693$$

$$99 \times 4 = 396$$

16. The LCM of two numbers is 14 times their HCF. The sum of LCM and HCF is 600. If one number is 80, then the other is-

(a) 160 (b) 60
(c) 40 (d) 280

Sol. (d) LCM = 14 HCF (Given)

$$\& \text{ LCM} + \text{HCF} = 600$$

$$\Rightarrow 14 \text{ HCF} + \text{HCF} = 600$$

$$\Rightarrow 15 \text{ HCF} = 600$$

$$\Rightarrow \text{HCF} = 40$$

Now, one number is given 80 Let other number be x

$$\therefore \text{Product of 2 number} = \text{HCF} \times \text{LCM}$$

$$80 \times x = 40 \times 560$$

$$x = 280$$

17. The HCF of two numbers is $\frac{1}{5}$ th of their LCM. If the product of the two numbers is 720, the HCF is-

(a) 20 (b) 12
(c) 15 (d) 18

Sol. (b) $\text{HCF} = \frac{1}{5} \text{ LCM}$

$$\Rightarrow \text{LCM} = 5 \text{ HCF}$$

$$\text{Product of 2 numbers} = 720$$

$$\text{Product of 2 numbers}$$

$$= \text{HCF} \times \text{LCM}$$

$$\Rightarrow 720 = \text{HCF} \times 5 \text{ HCF}$$

$$\Rightarrow 144 = x^2$$

$$\Rightarrow x = 12$$

$$\text{Hence HCF} = 12$$

18. Two numbers have 16 as their HCF and 146 as their LCM. Then, one can say that;

(a) Many such pairs of numbers exist.

(b) Only one such pair of numbers exists.

(c) No such pair of numbers exists.

(d) Only two such pairs of numbers exist.

Sol. (c) HCF of two numbers is 16

$\therefore$ Number can be $16x$ and $16y$ where x and y are prime

$$\text{LCM} = 146$$

$$\text{Product of 2 numbers}$$

$$= \text{HCF} \times \text{LCM}$$

$$16x \times 16y = 16 \times 146$$

$$xy = \frac{146}{16}$$

$$xy = 9.125$$

(not a whole no.)

$\therefore$ No such pair is possible

19. What is the greatest number that will exactly divide 96, 528 and 792?

(a) 12 (b) 48

(c) 36 (d) 24

Sol. (d) At the 1st step, we take the no. 96, 528

$$\begin{array}{r} 96 \overline{) 528} \quad 5 \\ \underline{480} \\ 48 \overline{) 96} \quad 2 \\ \underline{96} \\ 0 \end{array}$$

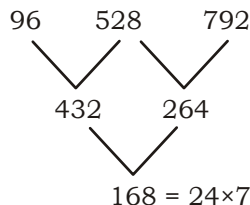
Again, HCF of 48 & 792

$$\begin{array}{r} 48 \overline{) 792} \\ \underline{48} \\ 312 \\ \underline{288} \\ 24 \overline{) 48} \quad 2 \\ \underline{48} \\ 0 \end{array}$$

Hence greatest number = 24

Alternate

To find the HCF of the numbers we take difference of consecutive no. & then factorise it.

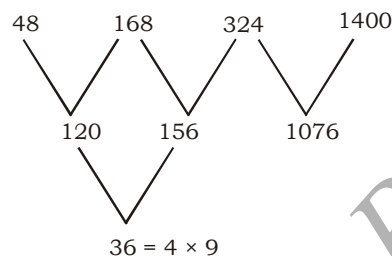


Checking by option, greatest no. will be = 24

20. What is the greatest number that will exactly divide 48, 168, 324 and 1400?

(a) 14 (b) 4
(c) 16 (d) 8

- Sol. (b) Given 48, 168, 324 & 1400 we taken smallest difference in these number and then factorise it
Hence



Hence, the greatest no. = 4

21. What is the greatest number that will divide 2930 and 3250 and will leave as remainders 7 and 11 respectively?

(a) 69 (b) 59
(c) 97 (d) 79

- Sol. (d) HCF of (2930-7) & (3250-11)
HCF of (2923 & 3239) = 79
HCF = 79

Hence greatest number = 79

22. What is the greatest number that will divide 29, 60 and 103 and will leave as remainders 5, 12 and 7 respectively?

(a) 24 (b) 16
(c) 12 (d) 14

- Sol. (a) HCF of (29-5), (60-12) & (103-7)
HCF of 24, 48 & 96

HCF = 24 = Greatest Number

23. What is the greatest number that will divide 130, 305 and 245 and will leave as remainders 6, 9 and 17 respectively?

(a) 4 (b) 8
(c) 5 (d) 24

- Sol. (a) HCF of (130-6), (305-9) & (245-17)

HCF of 124, 296 & 228 = 4

HCF = 4 = Greatest Number

24. Find the least number which is exactly divisible by 15, 55 and 99.

(a) 485 (b) 495
(c) 435 (d) 395

- Sol. (b) The least Number which is exactly divisible is L.C.M of these Number.

LCM of (15, 55 & 99) = 495

25. Find the smallest number which is exactly divisible by 999 and 9999.

(a) 1199889 (b) 1109989
(c) 1109999 (d) 1109889

- Sol. (d) LCM of 999 & 9999 = 1109889

26. What is the smallest number which when increased by 3 is divisible by 27, 35, 25 and 21?

(a) 4725 (b) 4722
(c) 4723 (d) 4728

- Sol. (b) LCM of (27, 35, 25 & 21) = 4725

smallest number which when increased by 3 is divisible is
 $= 4725 - 3 = 4722$

27. What is the least number which when decreased by 5 is divisible by 36, 48, 21 and 28?

(a) 1008 (b) 1003
(c) 1013 (d) 1023

- Sol. (c) LCM of (36, 48, 21 & 28) = 1008

Hence smallest number which when decreased by 5 is exactly

divisible = $1008 + 5$
 $= 1013$

28. What greatest number can be subtracted from 10000, so that the remainder may be divisible by 32, 36, 48 and 54?

(a) 9136 (b) 9316
(c) 1360 (d) 8640

- Sol. (a) LCM of (32, 36, 48 & 54) = 864

Greatest number will be $10000 - 864 = 9136$

29. Find the least number which when divided by 24, 32 and 36 leaves the remainders 19, 27 and 31 respectively.

(a) 283 (b) 823
(c) 382 (d) 238

- Sol. (a) In this type of question the difference between the divisor & the corresponding remainder is same in each case i.e.
 $24 - 19 = 5$, $32 - 27 = 5$, $36 - 31 = 5$

Required number

$= (\text{LCM of } 24, 32 \text{ and } 36) - 5$
 $= (288 - 5) = 283$

30. Find the greatest number of six digits which on being divided by 6, 7, 8, 9 and 10 leaves 4, 5, 6, 7 and 8 as remainder respectively.

(a) 997920 (b) 997918
(c) 998918 (d) 999918

- Sol. (b) The difference b/w the divisor & the corresponding remainder in each case i.e.

$6 - 4 = 2$, $7 - 5 = 2$, $8 - 6 = 2$, $9 - 7 = 2$, $10 - 8 = 2$

Now LCM of 6, 7, 8, 9, 10 = 2520

- $\therefore$ The greatest six digit number exactly divisible by 2520

$= 997920$

Required no = $997920 - 2$
 $= 997918$

31. What is the least multiple of 7, which when divided by 2, 3, 4, 5, and 6 leaves the remainders 1, 2, 3, 4 and 5 respectively.

(a) 119 (b) 126
(c) 112

(d) Can't be determined



Sol. (a) The difference b/w the divisor & the corresponding remainder in each case i.e.

$$2 - 1 = 1, 3 - 2 = 1, 4 - 3 = 1, 5 - 4 = 1, 6 - 5 = 1$$

∴ Required no = $60k - 1$

Which is multiple of 7

$$= 56k + 4k - 1$$

Now Put value of $K = 1, 2, 3, 4, 5, 6$, i.e.,

$$= 60 \times 2 - 1 = 119$$

32. Find the greatest number of six digits which when divided by 5, 7, 12 and 15 leaves respectively remainders 3, 5, 10 and 13.

- (a) 999600 (b) 999596
(c) 999598 (d) 999602

Sol. (c) The difference b/w the divisor & the corresponding remainder in each case i.e.,

$$5 - 3 = 2, 7 - 5 = 2, 12 - 10 = 2 \text{ \& } 15 - 13 = 2$$

Now LCM of 5, 7, 12 & 15 = 420
LCM = 420

∴ The greatest six digit number exactly divisible by 420 is 999600

So, required number after subtracting common remainder is = $999600 - 2 = 999598$

33. Find the least number which when divided by 18, 24, 30 and 42, will leave in each case the same remainder 1.

- (a) 2523 (b) 2521
(c) 2520 (d) 2519

Sol. (b) LCM of (18, 24, 30 & 42) = 2520

$$\text{Required no.} = 2520 + 1 = 2521$$

34. What smallest number must be subtracted from 7894135 so that the remainder when divided by 34, 38, 85 and 95

leaves the same remainder 11 in each case.

- (a) 6 (b) 8
(c) 4 (d) 3241

Sol. (c) LCM of (34, 38, 85 & 95) = 3230

After dividing 7894135 by 3230 we get 15 as a remainder.

But the remainder should be 11.

Hence, the required smallest number that must be subtracted = $15 - 11 = 4$

35. What is the least multiple of 17, which leaves a remainder of 1, when divided by each of the first twelve integers except unity?

- (a) 27720 (b) 138601
(c) 138599 (d) 27719

Sol. (b) LCM of first twelve integers excepting unity = 27720

The required no. is of form $(27720k + 1)$, that leave remainder 1 in each case

$$17 \overline{) 27720k + 1} \begin{array}{r} 1630k \\ 27710k \\ \hline 10k + 1 \end{array}$$

$(10k + 1)$ is remainder on dividing by 17

Now we find the least positive number for which $10k + 1$ is divisible by 17 by checking $k = 5$

$$\text{Required no} = 27720 \times 5 + 1 = 138601$$

36. Find the least number of six digits which when divided by 4, 6, 10 and 15, leaves in each case the same remainder 2.

- (a) 10020 (b) 10018
(c) 10022 (d) Can't be determined

Sol. (d) The least no. of six digit is = 100000

$$\text{LCM} = (4, 6, 10 \text{ \& } 15) = 60$$

After dividing 100000 By 60 we get that if we add 20 then number is exactly divisible by 60.

So In order to get 2 as remainder in each case we will simply add 2 to 100020

Least number is

$$= 100020 + 2$$

$$= 100022$$

37. Find the greatest number which is such that when 12288, 19139 and 28200 are divided by it, the remainders are all the same

- (a) 222 (b) 221
(c) 121 (d) 122

Sol. (b) In this type of question, firstly you find out the difference of these No. & then HCF of these number

$$\begin{array}{ccccccc} 12288 & & 19139 & & 28200 & & 12288 \\ & \swarrow & & \searrow & & \swarrow & \searrow \\ & 6851 & & 9061 & & 15912 & \\ & & \swarrow & & \searrow & & \\ & & 2210 & & 6851 & & \\ & & = 221 \times 10 & & = 221 \times 31 & & \end{array}$$

$$\text{HCF of } (6851, 9061, 15912) = 221$$

38. Find the greatest number which is such that when 76, 151 and 226 are divided by it, the remainders are all alike Find also the common remainder..

- (a) 57, 2 (b) 75, 2
(c) 75, 1 (d) 57, 1

Sol. (c) In this type of question, first you find the difference of given number & then HCF of these numbers.

Difference of number:-

$$\begin{array}{ccccccc} 76 & & 151 & & 226 & & 76 \\ & \swarrow & & \searrow & & \swarrow & \searrow \\ & 75 & & 75 & & 150 & \end{array}$$

$$\text{HCF of } 75, 75, 150 \text{ is } = 75$$

So 75 is the greatest number which when divided by these number the remainder is same & when we divide 76 by 75 we find 1 is remainder.

39. Which of the following numbers gives the same remainder when it divides 1110 and 864.

- (a) 123 (b) 213
(c) 245 (d) 132

Sol. (a) In these types of question if only two digit is given then we just take the difference between them and factorize it



So

$$\begin{array}{r} 1110 \quad 864 \\ \swarrow \quad \searrow \\ \text{difference} \rightarrow 246 = 2 \times 123 \end{array}$$

Hence, required number = 123

40. Find the greatest 3-digit number such that when divided by 3, 4 and 5, it leaves remainder 2 in each case.

(a) 122 (b) 962
(c) 958 (d) 118

- Sol. (b) The greatest three digit number is 999

LCM of (3, 4, 5) = 60

After dividing 999 by 60, we get 39 as remainder

$999 - 39 = 960$ is the greatest 3-digit number divisible by the given divisor

In order to get 2 as remainder in each case we will simply add 2 to 960

- $\therefore$ Greatest no
= $960 + 2 = 962$

41. Find the greatest number of 4 digits which, when divided by 16, 24 and 36 leaves 4 as a remainder in each case.

(a) 9936 (b) 9932
(c) 9940 (d) 9904

- Sol. (c) The greatest 4 digit number is 9999

LCM of (16, 24, 36) = 144

After dividing 9999 by 144 we get 63 as remainder.

$9999 - 63 = 9936$ is the greatest 4-digit no which is exactly divisible by the given divisor

In order to get 4 as remainder in each case we will simply add 4 to 9936

greatest number = $9936 + 4$
= 9940

42. Find the smallest 3-digit number, such that it is exactly divisible by 3, 4 and 5.

(a) 105 (b) 115
(c) 120 (d) 130

- Sol. (c) LCM of (3, 4 & 5) = 60

smallest 3-digit number is 100 on dividing it by 60 we find that it is completely divisible when 20 is added in it.

So 120 is smallest 3-digit number which exactly divisible by given number

43. Find the smallest 3-digit number, such that when divided by 3, 4 and 5, it leaves remainder 2 in each case.

(a) 118 (b) 120
(c) 122 (d) 132

- Sol. (c) LCM of (3, 4 & 5) = 60

smallest 3-digit no is 100 on dividing it by 60 we find that it is completely divisible when 20 is added in it so exactly divisible number = 120

In order to get 2 as remainder in each case we will simply add 2 to 120

So number is 122

44. Find the least number of five digits which when divided by 52, 56, 78 and 91 leaves no remainder.

(a) 10920 (b) 19020
(c) 10290 (d) 10820

- Sol. (a) least no of 5 digit is 10000

LCM of (52, 56, 78, 91) = 2184

on dividing 10000 by 2184 we find that after adding 920 in it will be exactly divisible by 2184.

$$\begin{array}{r} 2184 \overline{) 10000} 4 \\ \underline{8736} \\ 1264 \end{array}$$

Hence required number
= $10000 + 920 = 10920$

45. Find the least number which being divided by 2, 3, 4, 5, 6 leaves in each case a remainder 1, but when divided by 7 leaves no remainder.

(a) 301 (b) 201
(c) 302 (d) 310

- Sol. (a) The LCM of (2, 3, 4, 5 & 6) = 60
Required number is = $60k + 1$ which is exactly divisible by 7 for some value of k.

on dividing by 7 = $56k + 4k + 1$
put the value of k = 1, 2, 3, 4, 5 when we put the value of k = 5 then we get exactly divisible value by 7, = $60 \times 5 + 1$
Required number = 301

46. A heap of pebbles can be made up exactly into groups of 25, but when made up into groups of 18, 27 and 32, there is in each case a remainder of 11, find the least number of pebbles such a heap can contain.

(a) 775 (b) 975
(c) 785 (d) 875

- Sol. (d) The LCM of (18, 27 & 32) = 864
so required number = $864k + 11$ which is exactly divisible by 25.
= $34k + 14k + 11$

by putting k = 1, this number is completely divisible by 25

hence, required number
= $864 \times 1 + 11 = 875$

47. There are 4 numbers. The HCF of each pair is 7 and the LCM of all the 4 numbers is 1470. What is the product of 4 numbers?

(a) 504210 (b) 502410
(c) 504120
(d) Can't be determined

- Sol. (a) In this type of question we use this formula

$(HCF)^{n-1} \times LCM$

So $(7)^{4-1} \times 1470$

= $7^3 \times 1470 = 343 \times 1470$
= 504210

48. There are 4 numbers. The HCF of each pair is 5 and the LCM of all the 4 numbers is 2310. What is the product of 4 numbers?

(a) 288750 (b) 288570
(c) 828570 (d) 288650



Sol. (a) In this type of question, use this formula

$$\begin{aligned}\text{product} &= (\text{HCF})^{n-1} \times \text{LCM} \\ &= (5)^{4-1} \times 2310 = 5^3 \times 2310 \\ &= 125 \times 2310 = 288750\end{aligned}$$

49. There are 3 numbers. The HCF of each pair is 2 and the LCM of all the 3 numbers is 210. What is the product of 3 numbers?

- (a) 840 (b) 480
(c) 740 (d) 850

Sol. (a) In this type of question use this formula

$$\begin{aligned}\text{Product of the number} &= (\text{HCF})^{n-1} \times \text{LCM} \\ &= (2)^{3-1} \times 210 = 2^2 \times 210 \\ &= 4 \times 210 = 840\end{aligned}$$

50. In a school 391 boys and 323 girls have been divided into the largest possible equal classes, so that there are equal number of boys and girls in each class. What is the number of classes ?

- (a) 23 girl's classes, 19 boy's classes
(b) 23 boy's classes, 19 girl's classes
(c) 17 boy's classes, 23 girl's classes
(d) 23 boy's classes, 17 girl's classes

Sol. (a) HCF of (391 & 323) = 17

Divide this student by 17 (HCF). You can get the number of boys = $391 \div 17 = 23$ boy's classes

Girls = $323/17 = 19$ girl's classes

51. The product of two numbers is 4928. If 8 be their HCF. Find how many pairs of such numbers.

- (a) 3 (b) 4
(c) 2 (d) 1

Sol. (c) Product of two number is = 4928

HCF = 8

Let 1st number = $8x$

2nd number = $8y$

so

$$8x \times 8y = 4928$$

$$xy = \frac{4928}{8 \times 8} = 77$$

possible pairs:-

$$xy = \begin{array}{cc} & 77 \\ 1 & 77 \\ 7 & 11 \end{array}$$

Only two possible pairs.

52. Five bells begin to toll together and toll respectively intervals of 6, 7, 8, 9 and 12 seconds. How many times they will toll together in one hour, excluding the one at the start ?

- (a) 3 (b) 5
(c) 7 (d) 9

Sol. (c) In this type of question take the LCM of given number
LCM = 6, 7, 8, 9 & 12 = 504

It means in 504 second they bells together in one hour

$$\frac{60 \times 60}{504} = 7 \text{ times}$$

they ring 7 times together.

53. A merchant has three kinds of wine; of the first kind 403 gallons, of the second 527 gallons and of the third 589 gallons. What is the least number of full casks of equal size in which this can be stored without mixing

- (a) 21 (b) 29
(c) 33 (d) 31

Sol. (d) In this type of question first you find out the HCF & then given number will divided by HCF

$$\text{HCF} = 403, 527, 589$$

$$\begin{array}{c} 403 \quad 527 \quad 589 \\ \quad \swarrow \quad \searrow \\ \quad \quad 62 \end{array}$$

factor of 62 are (2,31)

31 is the required

54. When in each box 5 or 6 dozens of oranges were packed, three dozens were remaining. therefore, bigger boxes were taken to pack 8 or 9 dozens of oranges. However, still three dozens of oranges remained. What was the least number of dozens of oranges to be packed?

- (a) 216 (b) 243
(c) 363 (d) 435

Sol. (c) In this question take LCM
LCM = 5, 6, 8, 9 = 360

In every dozen pack 3 dozen orange were remained so add this 3 in LCM

$$\text{Required Number} = 360 + 3 = 363$$



Exercise

1. The LCM of two numbers is 864 and their HCF is 144. If one of the number is 288, the other number is
(a) 576 (b) 1296
(c) 432 (d) 144
2. LCM of two numbers is 225 and their HCF is 5. If one number is 25, the other number will be:
(a) 5 (b) 25
(c) 45 (d) 225
3. The LCM of two numbers is 30 and their HCF is 5. One of the numbers is 10. The other is number will be
(a) 20 (b) 25
(c) 15 (d) 5
4. The HCF and LCM of two numbers are 13 and 455 respectively. If one of the numbers lies between 75 and 125, then, that number is:
(a) 78 (b) 91
(c) 104 (d) 117
5. The least number which when divided by 4, 6, 8, 12 and 16 leaves a remainder of 2 in each case is:
(a) 46 (b) 48
(c) 50 (d) 56
6. The least number, which when divided by 12, 15, 20 or 54 leaves a remainder of 4 in each case is :
(a) 456 (b) 454
(c) 540 (d) 544
7. The maximum number of students among whom 1001 pens and 910 pencils can be distributed in such a way that each student gets same number of pens and same number of pencils, is :
(a) 91 (b) 910
(c) 1001 (d) 1911
8. Four bells ring at intervals of 4, 6, 8 and 14 seconds. They start ringing simultaneously at 12.00 O' clock. At what time will they again ring simultaneously?
(a) 12 hrs. 2 min. 48 sec
(b) 12 hrs. 3 min.
(c) 12 hrs. 3 min. 20 sec
(d) 12 hrs. 3 min. 44 sec
9. The product of the LCM and HCF of two numbers is 24. The difference of the two numbers is 2. Find the numbers ?
(a) 8 and 6 (b) 8 and 10
(c) 2 and 4 (d) 6 and 4
10. The LCM of two numbers is 495 and their HCF is 5. If the sum of the numbers is 100, then their difference is :
(a) 10 (b) 46
(c) 70 (d) 90
11. Two numbers, both greater than 29, have HCF 29 and LCM 4147. The sum of the numbers is :
(a) 966 (b) 696
(c) 669 (d) 666
12. The H.C.F. of two numbers is 8. Which one of the following can never be their L.C.M ?
(a) 24 (b) 48
(c) 56 (d) 60
13. The LCM and the HCF of the numbers 28 and 42 are in the ratio :
(a) 6 : 1 (b) 2 : 3
(c) 3 : 2 (d) 7 : 2
14. The LCM of two numbers is 1820 and their HCF is 26. If one number is 130 then the other number is:
(a) 70 (b) 1690
(c) 364 (d) 1264
15. The LCM of two numbers is 1920 and their HCF is 16. If one of the number is 128, find the other number:
(a) 204 (b) 240
(c) 260 (d) 320
16. The HCF of two number 12906 and 14818 is 478. Their LCM is:
(a) 400086 (b) 200043
(c) 600129 (d) 800172
17. Find the greatest number of five digits which when divided by 3, 5, 8, 12 leaves 2 as remainder
(a) 99999 (b) 99948
(c) 99962 (d) 99722
18. The least multiple of 13, which on dividing by 4, 5, 6, 7 and 8 leaves remainder 2 in each case is
(a) 2520 (b) 842
(c) 2522 (d) 840
19. Find the largest number of four digits such that on dividing by 15, 18, 21 and 24 the remainders are 11, 14, 17 and 20 respectively.
(a) 6557 (b) 7556
(c) 5675 (d) 7664
20. 4 bells ring at intervals of 30 minutes, 1 hour, $1\frac{1}{2}$ hour and 1 hour 45 minutes respectively. All the bells ring simultaneously at 12 noon. They will again ring simultaneously at:
(a) 12 mid night (b) 3 a.m.
(c) 6 a.m. (d) 9 a.m.
21. Four bells ring at the intervals of 5, 6, 8 and 9 seconds. All the bells ring simultaneously at some time. They will again ring simultaneously after :
(a) 6 minutes (b) 12 minutes
(c) 18 minutes (d) 24 minutes
22. The greatest number, which when divides 989 and 1327 leave remainders 5 and 7 respectively:
(a) 8 (b) 16
(c) 24 (d) 32



23. A milkman has 75 litres milk in one can and 45 litres in another. The maximum capacity of container which can measure milk of either container exact number :
 (a) 1 litre (b) 5 litres
 (c) 15 litres (d) 25 litres
24. Two numbers are in the ratio 3 : 4. If their HCF is 4, then their LCM is
 (a) 48 (b) 42
 (c) 36 (d) 24
25. Find the least multiple of 23, which when divided by 18, 21 and 24 leaves the remainder 7, 10 and 13 respectively.
 (a) 3013 (b) 3024
 (c) 3002 (d) 3036
26. The HCF of two numbers is 16 and their LCM is 160. If one of the number is 32, then the other number is :
 (a) 48 (b) 80
 (c) 96 (d) 112
27. The product of two number is 4107. If the HCF of the numbers is 37, the greater number is:
 (a) 185 (b) 111
 (c) 107 (d) 101
28. The least perfect square, which is divisible by each of 21, 36 and 66 is:
 (a) 214344 (b) 214434
 (c) 213444 (d) 231444
29. The least number, which when divided by 4, 5 and 6 leaves remainder 1, 2 and 3 respectively, is:
 (a) 57 (b) 59
 (c) 61 (d) 63
30. Let the least number of six digits which when divided by 4, 6, 10, 15 leaves in each case same remainder 2 be N. The sum of digits in N is:
 (a) 3 (b) 5
 (c) 4 (d) 6
31. Which is the least number which when doubled will be exactly divisible by 12, 18, 21 and 30?
 (a) 2520 (b) 1260
 (c) 630 (d) 196
32. The smallest square number divisible by 10, 16 and 24 is:
 (a) 900 (b) 1600
 (c) 2500 (d) 3600
33. From a point on a circular track 5 km long A, B and C started running in the same direction at the same time with speed of $2\frac{1}{2}$ km per hour, 3 km per hour and 2 km per hour respectively. Then on the starting point all three will meet again after
 (a) 30 hours (b) 6 hours
 (c) 10 hours (d) 15 hours
34. What is the least number of square tiles required to pave the floor of a room 15 m 17 cm long and 9 m 2 cm broad ?
 (a) 840 (b) 841
 (c) 820 (d) 814
35. If the ratio of the two numbers is 2 : 3 and their LCM is 54, then the sum of the two number is:
 (a) 5 (b) 15
 (c) 45 (d) 270
36. The ratio of two numbers is 4 : 5 and their LCM is 120. The numbers are
 (a) 30, 40 (b) 40, 32
 (c) 24, 30 (d) 36, 20
37. Three numbers which are coprime to one another are such that the product of the first two is 551 and that of the last two is 1073. The sum of the three numbers is:
 (a) 75 (b) 81
 (c) 85 (d) 89
38. HCF and LCM of two numbers are 7 and 140 respectively. If the numbers are between 20 and 45, the sum of the numbers is:
 (a) 70 (b) 77
 (c) 63 (d) 56
39. The HCF of two numbers is 15 and their LCM is 300. If one of the number is 60, the other is:
 (a) 50 (b) 75
 (c) 65 (d) 100
40. The HCF of two numbers is 23 and the other two factors of their LCM are 13 and 14. The larger of the two numbers is :
 (a) 276 (b) 299
 (c) 345 (d) 322
41. If the students of a class can be grouped exactly into 6 or 8 or 10, then the minimum number of students in the class must be.
 (a) 60 (b) 120
 (c) 180 (d) 240
42. The least number which when divided by 4, 6, 8 and 9 leave zero remainder in each case and when divided by 13 leaves a remainder of 7 is:
 (a) 144 (b) 72
 (c) 36 (d) 85
43. The number nearest to 10000, which is exactly divisible by each of 3, 4, 5, 6, 7 and 8, is :
 (a) 9240 (b) 10080
 (c) 9996 (d) 10000
44. Let N be the greatest number that will divide 1305, 4665 and 6905 leaving the same remainder in each case. Then, sum of the digits in N is:
 (a) 4 (b) 5
 (c) 6 (d) 8
45. The sum of two numbers is 36 and their HCF is 4. How many pairs of such number are possible?
 (a) 1 (b) 2
 (c) 3 (d) 4



46. The greatest number, that divides 122 and 243 leaving respectively 2 and 3 as remainders is:
(a) 12 (b) 24
(c) 30 (d) 120
47. The HCF and LCM of two 2-digit number are 16 and 480 respectively. The numbers are:
(a) 40, 48 (b) 60, 72
(c) 64, 80 (d) 80, 96
48. The smallest number, which when divided by 12 and 16 leaves remainder 5 and 9 respectively, is :
(a) 55 (b) 41
(c) 39 (d) 29
49. A number which when divided by 10 leaves a remainder of 9, when divided by 9 leaves a remainder of 8, and when divided by 8 leaves a remainder of 7, is:
(a) 1539 (b) 539
(c) 359 (d) 1359
50. What is the smallest number which leaves remainder 3 when divided by any of the numbers 5, 6 or 8 but leaves no remainder when it is divided by 9 ?
(a) 123 (b) 603
(c) 723 (d) 243
51. What is the least number which when divided by the number 3, 5, 6, 8, 10 and 12 leaves in each case a remainder 2 but when divided by 22 leaves no remainder ?
(a) 312 (b) 242
(c) 1562 (d) 1586
52. What is the greatest number that will divide 307 and 330 leaving remainder 3 and 7 respectively?
(a) 19 (b) 16
(c) 17 (d) 23
53. The sum of the HCF and LCM of two number is 680 and the LCM is 84 times the HCF. If one of the number is 56, the other is:
(a) 84 (b) 12
(c) 8 (d) 96
54. The LCM of two numbers is 20 times their HCF. The sum of HCF and LCM is 2520. If one of the number 480, the other number is:
(a) 400 (b) 480
(c) 520 (d) 600
55. The largest 4-digit number exactly divisible by each of 12, 15, 18 and 27 is:
(a) 9690 (b) 9720
(c) 9930 (d) 9960
56. Which greatest number will divide 3026 and 5053 leaving remainders 11 and 13 respectively?
(a) 19 (b) 30
(c) 17 (d) 45
57. The greatest number, by which 1657 and 2037 are divided to give remainders 6 and 5 respectively, is:
(a) 127 (b) 133
(c) 235 (d) 305
58. The product of two numbers is 1280 and their HCF is 8. The LCM of the number will be:
(a) 160 (b) 150
(c) 120 (d) 140
59. The least multiple of 7, which leaves the remainder 4, when divided by any of 6, 9, 15 and 18, is
(a) 76 (b) 94
(c) 184 (d) 364
60. The largest number of five digits which, when divided by 16, 24, 30, or 36 leaves the same remainder 10 in each case, is:
(a) 99279 (b) 99370
(c) 99269 (d) 99350
61. The least number, which is a perfect square and is divisible by each of the numbers 16, 20 and 24 is
(a) 1600 (b) 3600
(c) 6400 (d) 14400
62. The number nearest to 43582 divisible by each of 25, 50 and 75 is:
(a) 43500 (b) 43650
(c) 43600 (d) 43550
63. Three sets of English, Mathematics and Science books containing 336, 240, 96 books respectively have to be stacked in such a way that all the books are stored subject-wise and the height of each stack is the same. Total number of stacks will be:
(a) 14 (b) 21
(c) 22 (d) 48
64. Three numbers are in the ratio 2 : 3 : 4. If their LCM is 240, the smaller of the three numbers is
(a) 40 (b) 60
(c) 30 (d) 80
65. The sum of two numbers is 45. Their difference is $\frac{1}{9}$ of their sum. Their LCM is
(a) 200 (b) 250
(c) 100 (d) 150
66. The HCF of two numbers, each having three digits, is 17 and their LCM is 714. The sum of the numbers will be :
(a) 289 (b) 391
(c) 221 (d) 731
67. The HCF and product of two numbers are 15 and 6300 respectively. The number of possible pairs of the numbers is
(a) 4 (b) 3
(c) 2 (d) 1
68. The smallest number, which when divided by 5, 10, 12 and



- 15, leaves remainder 2 in each case, but when divided by 7 leaves no remainder, is:
- (a) 189 (b) 182
(c) 175 (d) 91
69. What least number must be subtracted from 1936 so that the resulting number when divided by 9, 10 and 15 will leave in each case the same remainder 7?
- (a) 37 (b) 36
(c) 39 (d) 30
70. The least number, which when divided by 18, 27 and 36 separately leaves remainders 5, 14, 23 respectively, is
- (a) 95 (b) 113
(c) 149 (d) 77
71. The smallest number, which when increased by 5 is divisible by each of 24, 32, 36 and 64, is
- (a) 869 (b) 859
(c) 571 (d) 427
72. Two numbers are in the ratio 3 : 4. If their LCM is 240, the smaller of the two number is :
- (a) 100 (b) 80
(c) 60 (d) 50
73. The product of the LCM and the HCF of two numbers is 24. If the difference of the numbers is 2, then the greater of the number
- (a) 3 (b) 4
(c) 6 (d) 8
74. The sum of two numbers is 216 and their HCF is 27. How many pairs of such numbers are there ?
- (a) 1 (b) 2
(c) 3 (d) 0
75. The LCM of two numbers is 12 times their HCF. The sum of the HCF and the LCM is 403. If one of the number is 93, then the other number is :
- (a) 124 (b) 128
(c) 134 (d) 38
76. The product of two numbers is 20736 and their HCF is 54. Find their LCM.
- (a) 685 (b) 468
(c) 648 (d) 384
77. The greatest number of four digits which when divided by 12, 16, and 24 leave remainders 2, 6 and 14 respectively is :
- (a) 9974 (b) 9970
(c) 9807 (d) 9998
78. When a number is divided by 15, 20 or 35, each time the remainder is 8. Then the smallest number is
- (a) 428 (b) 427
(c) 328 (d) 338
79. Two numbers are in the ratio 3 : 4. The product of their HCF and LCM is 2028. The sum of the numbers is
- (a) 68 (b) 72
(c) 86 (d) 91
80. Sum of two numbers is 384. HCF of the numbers is 48. The difference of the numbers is
- (a) 100 (b) 192
(c) 288 (d) 336
81. The LCM of two multiples of 12 is 1056. If one of the number is 132, the other number is
- (a) 12 (b) 72
(c) 96 (d) 132
82. The product of two numbers is 396×576 and their LCM is 6336. Find their HCF
- (a) 36 (b) 34
(c) 63 (d) 43
83. The HCF and LCM of two numbers are 8 and 48 respectively. If one of the number is 24, then the other number is:
- (a) 48 (b) 36
(c) 24 (d) 16
84. The HCF and LCM of two numbers are 12 and 336 respectively. If one of the number is 84, the other is :
- (a) 36 (b) 48
(c) 72 (d) 96
85. The product of two numbers is 216. If the HCF is 6, then their LCM is
- (a) 72 (b) 60
(c) 48 (d) 36
86. The HCF and LCM of two numbers are 18 and 378 respectively. If one of the number is 54, then the other number is:
- (a) 126 (b) 144
(c) 198 (d) 238
87. The greatest number, which when subtracted from 5834, gives a number exactly divisible by each of 20, 28, 32 and 35, is
- (a) 1120 (b) 4714
(c) 5200 (d) 5600
88. The smallest perfect square divisible by each of 6, 12 and 18 is:
- (a) 196 (b) 144
(c) 108 (d) 36
89. Two numbers are in the ratio 3 : 4. Their LCM is 84. The greater number is:
- (a) 21 (b) 24
(c) 28 (d) 84
90. The sum of two numbers is 84 and their HCF is 12. Total number of such pairs of number is
- (a) 2 (b) 3
(c) 4 (d) 5
91. The sum of two numbers is 36 and their HCF and LCM are 3 and 105 respectively. The sum of the reciprocals of two numbers:
- (a) $\frac{2}{35}$ (b) $\frac{3}{25}$
(c) $\frac{4}{35}$ (d) $\frac{2}{25}$
92. The LCM of two numbers is 44 times of their HCF. The sum of the LCM and HCF is 1125. If one number is 25, then the



other number is:

- (a) 1100 (b) 975
(c) 900 (d) 800
93. The HCF and LCM of two numbers are 12 and 924 respectively. Then the number of such pairs is :
(a) 0 (b) 1
(c) 2 (d) 3
94. The LCM of two numbers is 520 and their HCF is 4. If one of the number is 52, then the other number is
(a) 40 (b) 42
(c) 50 (d) 52
95. The HCF of two numbers is 96 and their LCM is 1296. If one of the number is 864, the other is
(a) 132 (b) 135
(c) 140 (d) 144
96. The LCM of two numbers is 4 times their HCF. The sum of LCM and HCF is 125. If one of the number is 100, then the other number is
(a) 5 (b) 25
(c) 100 (d) 125
97. The product of two numbers is 2028 and their HCF is 13. The number of such pair is
(a) 1 (b) 2
(c) 3 (d) 4
98. The LCM of three different numbers is 120. Which of the following cannot be their HCF?
(a) 8 (b) 12
(c) 24 (d) 35
99. The least number which when divided by 16, 18, 20 and 25 leaves 4 as remainder in each case but when divided by 7 leaves no remainder is:
(a) 17004 (b) 18000
(c) 18002 (d) 18004
100. The traffic lights at three different road crossings change after 24 seconds, 36 seconds and 54 seconds respectively. If they all change simultaneously at 10 : 15 : 00 AM, then at what time will they again change simultaneously ?
(a) 10 : 16 : 54 AM
(b) 10 : 18 : 36 AM
(c) 10 : 17 : 02 AM
(d) 10 : 22 : 12 AM
101. Find the HCF of $\frac{3}{4}$, $\frac{5}{6}$ and $\frac{6}{7}$
(a) $\frac{5}{14}$ (b) $\frac{1}{84}$
(c) $\frac{1}{63}$ (d) $\frac{1}{168}$
102. Four runners started running simultaneously from a point on a circular track. They took 200 seconds, 300 seconds, 360 seconds and 450 seconds to complete one round. After how much time do they meet at the starting point for the first time?
(a) 1800 seconds
(b) 3600 seconds
(c) 2400 seconds
(d) 4800 seconds
103. Three bells ring simultaneously at 11 a.m. They ring at regular intervals of 20 minutes, 30 minutes, 40 minutes respectively. The time when all the three ring together next is:
(a) 2 p.m. (b) 1 p.m.
(c) 1.15 p.m. (d) 1.30 p.m.
104. A farmer has 945 cows and 2475 sheep. He farms them into flocks, keeping cows and sheep separate and having the same number of animals in each flock. If these flocks are as large as possible, then the maximum number of animals in each flock and total number of flocks required for the purpose are respectively
(a) 15 and 228 (b) 9 and 380
(c) 45 and 76 (d) 46 and 75
105. The greatest 4-digit number exactly divisible by 10, 15, 20 is
(a) 9990 (b) 9960
(c) 9980 (d) 9995
106. The greatest number that divides 411, 684, 821 and leaves 3, 4 and 5 as remainders, respectively, is
(a) 254 (b) 146
(c) 136 (d) 204
107. The ratio of two numbers is 3 : 4 and their HCF is 5. Their LCM is:
(a) 10 (b) 60
(c) 15 (d) 12
108. If A and B are the HCF and LCM respectively of two algebraic expressions x and y , and $A + B = x + y$, then the value of $A^3 + B^3$ is
(a) $x^3 - y^3$ (b) x^3
(c) y^3 (d) $x^3 + y^3$
109. The HCF and LCM of two numbers are 44 and 264 respectively. If the first number is divided by 2, the quotient is 44. The other number is:
(a) 147 (b) 528
(c) 132 (d) 264
110. Three men step off together from the same spot. Their steps measure 63 cm, 70 cm and 77 cm respectively. The minimum distance each should cover so that all can cover the distance in complete steps is
(a) 9630 cm (b) 9360 cm
(c) 6930 cm (d) 6950 cm
111. Find the greatest number which will exactly divide 200 and 320.
(a) 10 (b) 20
(c) 16 (d) 40
112. 84 Maths books, 90 Physics books and 120 Chemistry books have to be stacked topicwise. How many books will be there in each stack so that each stack will have the same height too?
(a) 12 (b) 18
(c) 6 (d) 21



113. The greatest number that will divide 729 and 901 leaving remainders 9 and 5 respectively is
 (a) 15 (b) 16
 (c) 19 (d) 20
114. Three numbers are in the ratio 1 : 2 : 3 and their HCF is 12. The numbers are
 (a) 12, 24, 36 (b) 5, 10, 15
 (c) 4, 8, 12 (d) 10, 20, 30
115. If $x : y$ be the ratio of two whole numbers and z be their HCF, then the LCM of those two number is :
 (a) yz (b) $\frac{xz}{y}$
 (c) $\frac{xy}{z}$ (d) xyz
116. If the HCF and LCM of two consecutive (positive) even numbers be 2 and 84 respectively, then the sum of the numbers is:
 (a) 30 (b) 26
 (c) 14 (d) 34
117. If $P = 2^3 \cdot 3^{10} \cdot 5$: $Q = 2^5 \cdot 3 \cdot 7$, then HCF of P and Q is:
 (a) $2 \cdot 3 \cdot 5 \cdot 7$ (b) $3 \cdot 2^3$
 (c) $2^2 \cdot 3^7$ (d) $2^5 \cdot 3^{10} \cdot 5 \cdot 7$
118. A fraction becomes $\frac{1}{6}$ when 4 is subtracted from its numerator and 1 is added to its denominator. If 2 and 1 are respectively added to its numerator and the denominator, it becomes $\frac{1}{3}$. Then, the LCM of the numerator and denominator of the said fraction, must be
 (a) 14 (b) 350
 (c) 5 (d) 70
119. HCF of $\frac{2}{3}$, $\frac{4}{5}$ and $\frac{6}{7}$ is
 (a) $\frac{48}{105}$ (b) $\frac{2}{105}$
 (c) $\frac{1}{105}$ (d) $\frac{24}{105}$
120. What is the greatest number which will divide 110 and 128 leaving a remainder 2 in each case?
 (a) 8 (b) 18
 (c) 28 (d) 38
121. A milk vendor has 21 litres of cow milk, 42 litres of toned milk and 63 litres of double toned milk. If he wants to pack them in cans so that each can contains same litres of milk and does not want to mix any two kinds of milk in a can, then the least number of cans required is:
 (a) 3 (b) 6
 (c) 9 (d) 12
122. The LCM of two positive integers is twice the larger number. The difference of the smaller number and the GCD of the two numbers is 4. The smaller number is:
 (a) 12 (b) 6
 (c) 8 (d) 10
123. The HCF (GCD) of a , b is 12. a & b are positive integers and $a > b > 12$. The smallest values of (a, b) are respectively
 (a) 12, 24 (b) 24, 12
 (c) 24, 36 (d) 36, 24
124. Product of two co-prime numbers is 117. Then their LCM is
 (a) 117 (b) 9
 (c) 13 (d) 39
125. The product of two numbers is 2160 and their HCF is 12. Number of such possible pairs are
 (a) 1 (b) 2
 (c) 3 (d) 4
126. LCM of two numbers is 2079 and their HCF is 27. If one of the number is 189, the other number is:
 (a) 297 (b) 584
 (c) 189 (d) 216
127. Five bells begin to toll together and toll respectively at intervals of 6, 7, 8, 9 and 12 seconds. After how many seconds will they toll together again ?
 (a) 72 sec. (b) 612 sec.
 (c) 504 sec. (d) 318 sec.
128. LCM of $\frac{2}{3}$, $\frac{4}{9}$, $\frac{5}{6}$ is
 (a) $\frac{8}{27}$ (b) $\frac{20}{3}$
 (c) $\frac{10}{3}$ (d) $\frac{20}{27}$
129. The least number which when divided by 6, 9, 12, 15, 18 leaves the same remainder 2 in each case is:
 (a) 180 (b) 176
 (c) 182 (d) 178
130. The HCF of $x^6 - 1$ and $x^4 + 2x^3 - 2x^1 - 1$ is:
 (a) $x^2 + 1$ (b) $x - 1$
 (c) $x^2 - 1$ (d) $x + 1$
131. The greatest number by which 2300 and 3500 are divided leaving the remainders of 32 and 56 respectively. if
 (a) 168 (b) 42
 (c) 48 (d) 136
132. Let x be the smallest number, which when added to 2000 makes the resulting number divisible by 12, 16, 18 and 21. The sum of the digits of x is
 (a) 6 (b) 8
 (c) 7 (d) 5
133. Let x be the least number, which when divided by 5, 6, 7 and 8 leaves a remainder 3 in each case but when divided by 9 leaves remainder 0. the sum of digits of x is
 (a) 24 (b) 21
 (c) 22 (d) 18
134. A number when divided by 361 gives remainder 47. When the same number is divided by 19 then find the remainder?
 (a) 9 (b) 1
 (c) 8 (d) 3



135. The H.C.F and L.C.M of two numbers are 21 and 84 respectively. If the ratio of the two numbers is 1:4, then the larger of the two numbers is
(a) 48 (b) 12
(c) 84 (d) 108
136. The LCM of two numbers is 12 times their HCF. The sum of the HCF and LCM is 403. If one of the number is 93, then the other is
(a) 116 (b) 124
(c) 112 (d) 120
137. The number of pair of positive integers whose sum is 99 and HCF is 9 is:
(a) 5 (b) 2
(c) 3 (d) 4
138. The ratio of two numbers is 3 : 4 and their LCM is 120. The sum of numbers is:
(a) 70 (b) 35
(c) 140 (d) 105
139. The greatest four digit number which is exactly divisible by each one of the numbers 12, 18, 21 and 28.
(a) 9828 (b) 9882
(c) 9928 (d) 9288
140. The smallest five digit number which is divisible by 12, 18 and 21 is:
(a) 10080 (b) 30256
(c) 10224 (d) 50321
141. A numbers between 1000 and 2000 which when divided by 30, 36 and 80 gives a remainder 11 in each case is
(a) 1523 (b) 1451
(c) 1641 (d) 1712
142. The difference between the greatest and least prime numbers which are less than 100 is
(a) 95 (b) 96
(c) 97 (d) 94
143. The number between 4000 and 5000 that is divisible by each of 12, 18, 21 and 32 is
(a) 4203 (b) 4023
(c) 4032 (d) 4302
144. The ratio of HCF of LCM of two numbers a and b is 1 : 30 and the difference between the HCF and LCM is 493. Find the possible number of pairs of a and b.
(a) One (b) Two
(c) Four (d) Five
145. The LCM of four consecutive numbers is 60. The sum of the first two numbers is equal to the fourth number. What is the sum of four numbers?
(a) 17 (b) 14
(c) 21 (d) 24
146. If the product of three consecutive number is 210 then the sum of the two smaller number is:
(a) 3 (b) 4
(c) 5 (d) 11

ANSWER KEY

1. (c)	16. (a)	31. (b)	46. (d)	61. (b)	76. (d)	91. (c)	106.(c)	121.(b)	136.(b)
2. (c)	17. (c)	32. (d)	47. (d)	62. (b)	77. (a)	92. (a)	107.(b)	122.(c)	137.(a)
3. (c)	18. (c)	33. (c)	48. (b)	63. (a)	78. (a)	93. (c)	108.(d)	123.(d)	138.(a)
4. (b)	19. (b)	34. (d)	49. (c)	64. (a)	79. (d)	94. (a)	109.(c)	124.(a)	139.(a)
5. (c)	20. (d)	35. (c)	50. (d)	65. (c)	80. (c)	95. (d)	110.(c)	125.(b)	140.(a)
6. (d)	21. (a)	36. (c)	51. (b)	66. (c)	81. (c)	96. (b)	111.(d)	126.(a)	141.(b)
7. (a)	22. (c)	37. (c)	52. (a)	67. (c)	82. (a)	97. (b)	112.(c)	127.(c)	142.(a)
8. (a)	23. (c)	38. (c)	53. (d)	68. (b)	83. (d)	98. (d)	113.(b)	128.(b)	143.(c)
9. (d)	24. (a)	39. (b)	54. (d)	69. (c)	84. (b)	99. (d)	114.(a)	129.(c)	144.(c)
10. (a)	25. (a)	40. (d)	55. (b)	70. (a)	85. (d)	100.(b)	115.(d)	130.(c)	145.(b)
11. (b)	26. (b)	41. (b)	56. (d)	71. (c)	86. (a)	101.(b)	116.(b)	131.(b)	146.(d)
12. (d)	27. (b)	42. (b)	57. (a)	72. (c)	87. (b)	102.(a)	117.(b)	132.(c)	
13. (a)	28. (c)	43. (b)	58. (a)	73. (c)	88. (d)	103.(b)	118.(a)	133.(d)	
14. (c)	29. (a)	44. (a)	59. (d)	74. (b)	89. (c)	104.(c)	119.(b)	134.(a)	
15. (b)	30. (b)	45. (c)	60. (b)	75. (a)	90. (b)	105.(b)	120.(b)	135.(c)	

Solution

1. (c) $\text{LCM} \times \text{HCF} = \text{Ist number} \times \text{IInd number}$
or
Product of numbers = $\text{HCF} \times \text{LCM}$
 $\Rightarrow \text{LCM} = 864$
 $\text{HCF} = 144$
one number $x = 288$
 $\therefore$ Let other no. be y
 $\therefore xy = \text{LCM} \times \text{HCF}$
 $\Rightarrow 288 \times y = 864 \times 144$

$$y = \frac{864 \times 144}{288} = 432$$

 $\therefore$ Other no. will be 432
2. (c) $\text{LCM} = 225$
 $\text{HCF} = 5$
one number = 25
 $\therefore$ Let other number be y
 $\therefore 25 \times y = 225 \times 5$

$$y = \frac{225 \times 5}{25} = 45$$

 $\therefore$ Another no. is **45**
3. (c) $\text{LCM} = 30$
 $\text{HCF} = 5$ (given)
One number = 10
Let another number = y
 $\therefore 10y = 30 \times 5$

$$y = 15$$
4. (b) $\text{HCF} = 13$
 $\text{LCM} = 455$
 $\therefore$ Let numbers be $13x$ & $13y$
 $\therefore \text{LCM} = 13xy$
 $\therefore \text{LCM} = \text{HCF} \times \text{Product of other factor}$
 $13xy = 455$

$$xy = \frac{455}{13} = 35$$

 $\Rightarrow xy = 35$
Possible co-prime Factors of $x, y \Rightarrow (35, 1), (5, 7)$
 $\therefore$ Numbers may be
- $\Rightarrow 35 \times 13, 1 \times 13 = (455, 13)$
or
 $\Rightarrow 5 \times 13, 7 \times 13 = (65, 91)$
 $\Rightarrow$ But it is given that one number lies between (75 & 125) so.
 $\Rightarrow$ Numbers are (65, 91) and number between 75 & 125 is 91. (65, 91)
5. (c) $\text{LCM of } (4, 6, 8, 12, 16)$
 $\Rightarrow 16 \times 3 = 48$
 $\therefore$ The number when divided by (4, 6, 8, 12, 16) leaves remainder 2 is $= 48 + 2 = 50$
6. (d) $\text{LCM of } (12, 15, 20, 54)$
 $\Rightarrow 4 \times 3 \times 5 \times 9 = 540$
 $\therefore$ The required number is $540 + 4 = 544$
 $\Rightarrow$ Because when divided by LCM each is divided completely. By adding 4 in LCM leaves remainder 4.
7. (a) 1001 pens, 910 pencils (given)
 $\text{HCF of } 1001, 910 \text{ is } = 91$
 $\therefore$ Maximum no. of students are = 91
8. (a) $\text{LCM of } 4, 6, 8, 14 = 168$ seconds

2	4, 6, 8, 14
2	2, 3, 4, 7
	1, 3, 2, 7

 $\text{LCM} = 3 \times 2 \times 7 \times 2 \times 2 = 168$ seconds
 $= \frac{168}{60} = 2 \frac{48}{60} = 2 \text{ minute } 48 \text{ seconds}$
 $\therefore$ Ist they start ringing at 12.00 O'clock
 $\Rightarrow$ Again they ring all together after 2 minutes 48 seconds at 12 hrs.
2 min. 48 seconds
9. (d) $\text{LCM} \times \text{HCF} = 24$
 $\therefore$ Product of numbers = 24
Let no. be $= x, y$
- $xy = 24$
and $x - y = 2$ (given)
Factors of $xy = 24$ are (4, 6) (12, 2) (8, 3) (24, 1)
 $\Rightarrow$ Now difference between numbers be $= (x - y) = 2$
So, factor is (4, 6)
10. (a) $\text{LCM} = 495$
 $\text{HCF} = 5$ (given)
 $\therefore$ Let numbers are
 $= 5x \text{ \& } 5y$
 $\therefore \text{LCM} = 5xy$
 $5xy = 495$

$$xy = 99$$

 $\therefore$ Possible co-prime factors are
 $\begin{bmatrix} 1, 99 \\ 9, 11 \end{bmatrix}$
 $\therefore$ Possible numbers are

$$5x, 5y = \begin{bmatrix} 45, 55 \\ 5, 495 \end{bmatrix}$$

Now given that sum of numbers = 100
So, required numbers are = (45, 55)
 $\therefore$ Difference of numbers = $55 - 45 = 10$
11. (b) $\text{HCF} = 29$
 $\therefore$ Let numbers are $29x, 29y$
 $\text{LCM} = 29xy$
 $\Rightarrow \text{LCM} = 4147$ (given)
 $\Rightarrow 29xy = 4147$

$$xy = \frac{4147}{29} = 143$$

Possible co-prime factors
 $= \begin{pmatrix} 1, 143 \\ 11, 13 \end{pmatrix}$
 $\therefore$ Possible numbers are
 $= (29, 4147), (319, 377)$
But both numbers are greater than 29 (given)
 $\therefore$ Numbers are (319, 377)
 $\therefore$ Sum of numbers
 $= 319 + 377 = 696$
12. (d) $\text{HCF} = 8$
 $\Rightarrow$ Now, LCM should have a factor 8.
So, check also the option we have only 60 which does not

have a factor 8. So, it will never be the LCM.

13. (a) Numbers, $x = 28$, $y = 42$
HCF (28, 42)

$\Rightarrow$ Difference = $42 - 28 = 14$
 $\Rightarrow$ For HCF of any numbers take their difference. HCF will be either the factor of that difference or the difference itself.

Now,

LCM of 28, 42

$$\therefore 14 \times 2 \times 3 = 84$$

$$\Rightarrow \begin{array}{l} \text{LCM} : \text{HCF} \\ 84 : 14 \\ \mathbf{6 : 1} \end{array}$$

14. (c) LCM = 1820

HCF = 26

Ist number = 130

$\Rightarrow \text{LCM} \times \text{HCF} = \text{Product of numbers}$

$\Rightarrow$ Let the other number is x

$$\therefore 130 \times x = 1820 \times 26$$

$$x = \frac{1820 \times 26}{130} = 364$$

15. (b) LCM = 1920

HCF = 16

Ist number = 128

Let IInd number = x

$$x \times 128 = 1920 \times 16$$

$$x = \frac{1920 \times 16}{128} = 240$$

$$x = \mathbf{240}$$

16. (a) HCF = 478

Numbers are = 12906 and 14818

$$\therefore \text{LCM} \times \text{HCF} = 12906 \times 14818$$

$$\text{LCM} \times 478 = 12906 \times 14818$$

$$\text{LCM} = 400086$$

17. (c) LCM (3, 5, 8, 12) $\Rightarrow 3 \times 5 \times 8 = \mathbf{120}$

$\Rightarrow$ Now greatest five digit number is 99999

on dividing 99999 by = 120 (LCM) we get remainder -

$$= \frac{99999}{120}, \text{ remainder} = 39$$

$\Rightarrow$ By subtracting remainder from

99999 we get the greatest five digit number which is completely divisible by given numbers

$$\therefore 99999 - 39 = 99960$$

$\Rightarrow$ Now, we required the greatest five digit number which when divided by (3, 5, 8, 12) leaves remainder 2 in each case.

$\Rightarrow$ Add 2 in the 99960

$$= 99960 + 2 = \mathbf{99962}$$

18. (c) LCM (4, 5, 6, 7, 8)

$$= 4 \times 5 \times 6 \times 7 = 840$$

$\Rightarrow$ Required number

= $840k + 2$, which is divisible by 13.

$$\text{For } \frac{840k + 2}{13}, (\text{remainder} = 0)$$

$$\text{Remainder} = \frac{8k + 2}{13}$$

Put $k = 3$

Then, remainder = 0

For least multiple value of k is minimum

$\Rightarrow$ At $k = 3$ we get $840k + 2$

$$= 840 \times 3 + 2$$

$$= 2520 + 2 = \mathbf{2522}$$

19. (b) LCM (15, 18, 21, 24)

$$\Rightarrow 5 \times 3 \times 6 \times 7 \times 4 = 2520$$

$\Rightarrow$ In such type of questions, we take the difference between given number and remainder of that number.

Number Remainder

$$\Rightarrow \left. \begin{array}{l} (15 - 11) = 4 \\ (18 - 14) = 4 \\ (21 - 17) = 4 \\ (24 - 20) = 4 \end{array} \right\} \text{It will be same always}$$

Now: Largest 4 digit number is 9999

$\Rightarrow$ On dividing 9999 by LCM (2520) we get remainder $\Rightarrow 2439$

Subtract remainder from 9999 we get largest 4 digit number, which is divisible by given number

$$= 9999 - 2439 = 7560$$

But required no. gives difference on dividing

so,

$\therefore$ Our required number

$$= 7560 - 4(\text{difference}) = 7556$$

20. (d) LCM (30, 60, 90, 105)

$$\therefore 15 \times 2 \times 2 \times 3 \times 7 = 1260 \text{ minutes}$$

$$\frac{1260}{60} = 21 \text{ hours}$$

(They ring simultaneously after every 21 hours)

They ring at 12 noon. So they again ring at 9 am

21. (a) LCM (5, 6, 8, 9) = $5 \times 6 \times 4 \times 3$
= 360 seconds

$$= \frac{360}{60} = 6 \text{ minutes}$$

$\Rightarrow$ Bells will ring simultaneously after every 6 minutes.

22. (c) $989 - 5 = 984$

$$1327 - 7 = 1320$$

(Subtract the remainder from the number.)

$$\text{HCF} = (984, 1320) = 24$$

For greatest number take HCF of the numbers

23. (c) 75 litres, 45 litres

For maximum capacity take HCF (75, 45) = 15

24. (a) Let numbers be

$$= x, y$$

$$x : y = 3 : 4 \text{ (given)}$$

$$\text{HCF} = 4$$

$$\therefore \text{Numbers are} = x = 4 \times 3 = 12$$

$$y = 4 \times 4 = 16$$

$$\text{LCM} (12, 16) = 4 \times 3 \times 4 = \mathbf{48}$$

25. (a) $18 - 7 = 11$

$$21 - 10 = 11$$

$$24 - 13 = 11$$

$$\text{Take LCM} (18, 21, 24) \Rightarrow 9 \times 2 \times 7 \times 4 = 504$$

$\Rightarrow$ Required number = $(504k - 11)$ which is divided by 23.

$$\therefore \text{For } \frac{504k - 11}{23},$$

Remainder should be zero

Put minimum value of k so that it completely divides 23.

$\Rightarrow$ At $k = 6$, $504k - 11 = 3013$ completely divisible by 23.

$\therefore$ Required number is = 3013.

26. (b) HCF = 16

$$\text{LCM} = 160$$

Ist number = 32
 Let IInd number = x
 Product of number = LCM $\times$ HCF

$$\therefore 32 \times x = 16 \times 160$$

$$x = \frac{16 \times 160}{32} = 80$$

27. (b) HCF = 37

$\therefore$ Let the no. are = $37x$ & $37y$
 given, $37x \times 37y = 4107$
 $= xy = 3$

Possible factors of $xy = (1, 3)$

$\therefore$ Numbers are $(37, 37 \times 3) = (37, 111)$
 greater number is = **111**

28. (c) LCM of (21, 36, 66)

$$= 21 \times 12 \times 11$$

$$= 7 \times 3 \times 4 \times 3 \times 11$$

$$= 7 \times 3 \times 2 \times 2 \times 3 \times 11$$

For perfect square multiply by 7×11

So that pairs of number from perfect square

$$\therefore \boxed{7 \times 7} \times \boxed{3 \times 3} \times \boxed{2 \times 2} \times \boxed{11 \times 11}$$

required result is $\Rightarrow$ **213444**

(which is perfect square)

29. (a) $4 - 1 = 3$

$$5 - 2 = 3$$

$$6 - 3 = 3$$

$$\text{LCM}(4, 5, 6) = 4 \times 5 \times 3 = 60$$

$\therefore$ Required number is

$$60 - 3 = 57$$

30. (b) LCM (4, 6, 10, 15)

$$\text{LCM} = 2 \times 2 \times 3 \times 5 = 60$$

$\Rightarrow$ Least number of six digit

$$= 100000$$

$\Rightarrow$ Divide 100000 by 60 we get remainder 40

$\Rightarrow$ Least six digit number which is divisible by (4, 6, 10, 15) given number is

$$= (100000 + (60 - 40)) = 100020$$

$$\therefore N \Rightarrow 100020 + 2 = 100022$$

$\therefore$ Sum of digits

$$= 1+0+0+0+2+2 = 5$$

31. (b) LCM (12, 18, 21, 30)

$$4 \times 3 \times 6 \times 7 \times 5 = 2520$$

So, required number

$$= \frac{2520}{2} = \mathbf{1260}$$

32. (d) LCM (10, 16, 24)

$$= 5 \times 2 \times 8 \times 3 = 240$$

$\Rightarrow$ For square no. split the LCM into its factors

$$= 5 \times 2 \times 2 \times 2 \times 2 \times 3$$

$$= \boxed{5 \times 5} \times \boxed{2 \times 2} \times \boxed{2 \times 2} \times \boxed{3 \times 3} = \mathbf{3600}$$

33. (c) Distance = 5 km

$$\text{Speed of A} = 2\frac{1}{2} \text{ km/hr}$$

$$\text{Time taken by A} = \frac{5}{2\frac{1}{2}} = 2$$

hours

$\Rightarrow$ Speed of B = 3 km/hr

$$\text{Time taken by B} = \frac{5}{3} \text{ hours}$$

$\Rightarrow$ Speed of C = 2 km/hour

$$\therefore \text{Time taken by C} = \frac{5}{2} \text{ hours}$$

$$\frac{\text{LCM of numerator}}{\text{HCF of denominator}} = \frac{5}{\frac{5}{2}}, \frac{5}{\frac{5}{3}}, \frac{5}{\frac{5}{2}}$$

$$= \frac{10}{5}, \frac{5}{3}, \frac{5}{2}$$

$$\text{LCM} = \frac{10}{1} = \mathbf{10}$$

They will meet again after **10 hours**

34. (d) Required no. of tiles are

$$= \frac{\text{area of floor}}{\text{area of tiles}}$$

$$\text{Sides of tiles is HCF}(1517, 902) = 41$$

$$\therefore \text{Area of tiles} = 41 \times 41$$

$\therefore$ No. of tiles

$$= \frac{1517 \times 902}{41 \times 41} = \mathbf{814}$$

35. (c) Let numbers are A & B respectively

$$A : B$$

$$2x : 3x \quad (\text{given})$$

$$\text{LCM} = 2 \times 3 \times x = 6x$$

According to the question,

$$6x = 54$$

$$x = 9$$

$$\therefore A = 2x = 2 \times 9 = 18$$

$$B = 3x = 3 \times 9 = 27$$

$\therefore$ Sum of numbers

$$= A + B = 18 + 27 = 45$$

$$(3x + 2x) = 5x = 5 \times 9 = 45$$

36. (c) Let numbers are A & B respectively

$$A : B$$

$$4x : 5x \quad (\text{given})$$

$$\therefore \text{LCM} = 4 \times 5 \times x = 20x$$

$$\therefore 20x = 120$$

$$x = 6$$

$$\therefore A = 4x = 4 \times 6 = 24$$

$$B = 5x = 5 \times 6 = 30$$

37. (c) Let numbers are a, b, c.

= a, b, c are co-prime numbers

HCF of co-prime numbers = 1

$$\therefore \text{HCF}(a, b, c) = 1$$

$$\therefore a \times b = 551, \quad b \times c = 1073$$

$$\Rightarrow \frac{a \times b}{b \times c} = \frac{1073}{551} = \frac{37 \times 29}{19 \times 29}$$

$$\Rightarrow \frac{a}{c} = \frac{37}{19}$$

$\Rightarrow$ Common 'b' factor is cancel out.

$$\therefore a = 37, \quad b = 29 \quad c = 19$$

$\therefore$ Sum of numbers

$$= a + b + c = 37 + 29 + 19 = 85$$

38. (c) HCF of numbers = 7

$\therefore$ Let the numbers are $7x$ and $7y$

$$\text{LCM} = 7xy$$

$$7xy = 140$$

(given)

$$xy = 20$$

$\Rightarrow$ Possible co-prime factors of xy

$$= (1, 20), (4, 5)$$

$\Rightarrow$ Numbers are between 20 and 45

$\therefore$ Required numbers are

$$= 4 \times 7 = 28 \text{ and } 5 \times 7 = 35$$

$\Rightarrow$ Sum of numbers are = $28 + 35 = \mathbf{63}$

39. (b) HCF = 15

$$\text{LCM} = 300$$

$$\text{1st number} = 60$$

$$\text{Let 2nd number} = x$$

$$\text{HCF} \times \text{LCM} = \text{1st Number} \times \text{2nd number}$$

$$15 \times 300 = 60 \times x$$

$$x = 75$$

$$\therefore \text{Other number} = \mathbf{75}$$

$$40. (d) \text{HCF} = 23$$

$$\therefore \text{Let numbers are}$$

$$= 23x, 23y$$

$$\therefore \text{LCM} = 23xy$$

$$\Rightarrow \text{Now given that factor of LCM are } 13, 14$$

$$\therefore \text{LCM} = 23 \times 13 \times 14$$

$$\text{Numbers are} = 23 \times 13$$

$$= 299 \text{ and } 23 \times 14 = 322$$

$$\text{larger} = 322$$

$$41. (b) \text{LCM}(6, 8, 10) = 3 \times 2 \times 4 \times 5 = 120$$

$$42. (b) \text{LCM}(4, 6, 8, 9) = 2 \times 2 \times 3 \times 2 \times 3 = 72$$

$$\therefore \text{Required result should be} = 72$$

$$43. (b) \text{LCM}(3, 4, 5, 6, 7, 8)$$

$$3 \times 4 \times 5 \times 7 \times 2 = 840$$

$$\Rightarrow \text{Divide } 10000 \text{ by LCM}$$

$$\Rightarrow \frac{10000}{840}, \text{ we get remainder} = 760$$

$$\text{Now two possibilities are}$$

$$= 10000 - 760 = 9240$$

$$\text{or } 10000 + (840 - 760) = 10080$$

$$\text{So, nearest number is} = 10080.$$

$$44. (a) 1305, 4665, 6905 \text{ are three numbers greatest number which leaves same remainder in each case. To find this take difference of numbers } (1305, 4665, 6905)$$

$$\Rightarrow 1305 \quad 4665 \quad 6905$$

$$\begin{array}{ccc} & \nearrow & \nearrow \\ -3360 & & -2240 \\ & \searrow & \searrow \\ & -1120 & \end{array}$$

$$\therefore 1120 \text{ is the no. which leaves the same remainder when divide } 1305, 4665, 6905$$

$$\therefore \text{Sum of number digit}$$

$$\Rightarrow 1 + 1 + 2 + 0 = 4$$

$$45. (c) \text{HCF} = 4$$

$$\therefore \text{Let numbers are } 4x \text{ and } 4y$$

$$\text{Given sum} = 4x + 4y = 36 \text{ and } x + y = 9$$

$$\text{possible pairs} \Rightarrow (1+8), (2+7), (4+5), \text{ numbers should be co prime. Hence only 3 pairs}$$

$$46. (d) \begin{array}{l} 122 - 2 = 120 \\ 243 - 3 = 240 \end{array} \left(\begin{array}{l} \text{subtract difference} \\ \text{from number} \end{array} \right)$$

$$\text{HCF} = (120, 240) = 120$$

$$\therefore \text{Answer} = 120$$

$$47. (d) \text{HCF} = 16$$

$$\therefore \text{Let numbers are } 16x \text{ and } 16y$$

$$16xy = 480$$

$$xy = 30$$

$$\therefore \text{Possible pairs}$$

$$= (1, 30), (2, 15), (6, 5)$$

$$\text{possible numbers are}$$

$$= (16, 480), (32, 240), (80, 96)$$

$$\therefore 80, 96 \text{ is the answer in the given options of 2 digit.}$$

$$48. (b) 12 - 5 = 7$$

$$16 - 9 = 7$$

$$\text{Remainder always remains same in such question,}$$

$$\therefore \text{LCM}(12, 16) = 48$$

$$\therefore \text{Required result} = 48 - 7 = 41$$

$$49. (c) 10 - 9 = 1$$

$$9 - 8 = 1$$

$$8 - 7 = 1$$

$$\therefore \text{LCM}(10, 9, 8) = 5 \times 2 \times 9 \times 4 = 360$$

$$\therefore \text{Required result} = 360 - 1 = 359$$

$$50. (d) \text{LCM}(5, 6, 8) = 5 \times 6 \times 4 = 120$$

$$\Rightarrow \text{Required number gives remainder 3 when divided by } (5, 6, 8) \text{ and zero remainder when divided by 9}$$

$$\therefore \frac{120K+3}{9} = \frac{3K+3}{9}$$

$$\text{at } k = 2, \frac{3K+3}{9}$$

$$\Rightarrow \text{Remainder} = 0$$

$$\text{We get } 120K + 3 = 120 \times 2 + 3 = 243 \text{ which is the required number.}$$

$$51. (b) \text{LCM}(3, 5, 6, 8, 10, 12)$$

$$= 3 \times 5 \times 2 \times 4 = 120$$

$$\text{Required number is}$$

$$= \frac{120K+2}{22} = \frac{10K+2}{22}$$

$$\text{at } k = 2, \frac{10K+2}{22}$$

$$\Rightarrow \text{Remainder} = 0$$

$$\text{The given condition satisfies}$$

$$= 120K + 2 = 240 + 2 = 242$$

$$52. (a) 307 - 3 = 304$$

$$330 - 7 = 323$$

$$\Rightarrow \text{HCF}(304, 323)$$

$$\begin{array}{ccc} 304 & & 323 \\ & \searrow & \nearrow \\ & -19 & \end{array}$$

$$\therefore \text{HCF} = 19$$

$$\text{The greatest no. is} = 19.$$

$$53. (d) \text{Let HCF} = x$$

$$\therefore \text{LCM} = 84x$$

$$\therefore \text{Given HCF} + \text{LCM} = 84x + x = 680$$

$$85x = 680$$

$$x = 8$$

$$\therefore \text{HCF} = 8$$

$$\text{LCM} = 84 \times 8 = 672$$

$$\Rightarrow 56 \times y = 672 \times 8$$

$$y = \frac{672 \times 8}{56} = 96$$

$$54. (d) \text{Let HCF} = x$$

$$\therefore \text{LCM} = 20x$$

$$\text{Sum of HCF} + \text{LCM} = 2520$$

$$= x + 20x = 2520$$

$$21x = 2520$$

$$x = 120$$

$$\therefore \text{HCF} = 120$$

$$\text{LCM} = 120 \times 20 = 2400$$

$$\therefore \text{one number} = 480$$

$$\text{Let another number} = y$$

$$\therefore y \times 480 = 120 \times 2400$$

$$y = \frac{120 \times 2400}{480} = 600$$

$$55. (b) \text{LCM}(12, 15, 18, 27)$$

$$\Rightarrow 4 \times 3 \times 5 \times 3 \times 3 = 540$$

$$\Rightarrow \text{largest 4 digit number} = 9999$$

$$\text{on dividing by 540 to number}$$

$$= \frac{9999}{540}$$

$$\text{Remainder is} = 279$$

$$\therefore \text{Required number} = 9999 - 279 = 9720$$

$$56. (d) 3026 - 11 = 3015$$

$$5053 - 13 = 5040$$

$$\Rightarrow \text{HCF}(3015, 5040)$$

$$\begin{array}{ccc} 3015 & & 5040 \\ & \searrow & \nearrow \\ & -2025 & = (45 \times 55) \end{array}$$

⇒ Take difference between numbers. The HCF may be difference itself or may a factor of this difference.

$$\text{HCF} = 45$$

$$57. (a) 1657 - 6 = 1651$$

$$2037 - 5 = 2032$$

$$2032 - 1651 \Rightarrow 381 = 127 \times 3$$

$$\text{HCF} = 127$$

$$58. (a) \text{ Product of two numbers} = 1280$$

$$\text{HCF} = 8$$

$$\text{LCM} = \frac{1280}{8} = 160$$

$$59. (d) \text{LCM}(6, 9, 15, 18) = 3 \times 2 \times 3 \times 5 = 90$$

Required no. gives remainder 4 when divided by (6, 9, 15 and 18) and zero remainder when divided by '7'

$$\frac{90k+4}{7} = \frac{6K+4}{7}$$

$$\text{At } K = 4, \frac{6K+4}{7} \Rightarrow \text{remainder} = 0$$

$$\text{So, number is } 90K + 4 = 90 \times 4 + 4 = 364$$

We get **364** which is the required no.

$$60. (b) \text{LCM}(16, 24, 30, 36)$$

$$= 8 \times 2 \times 3 \times 5 \times 3 = 720$$

Largest 5 digit number is = 99999

Divide 99999 by LCM (720)

$$= \frac{99999}{720}, \text{ we get remainder} = 639$$

So, The largest 5 digit number which divides completely the given number is

$$= 99999 - 639 = \mathbf{99360}$$

$$\therefore \text{Required no. is } 99360 + 10 = \mathbf{99370}$$

$$61. (b) \text{LCM}(16, 20, 24)$$

$$= 8 \times 2 \times 5 \times 3$$

$$= \underbrace{2 \times 2 \times 2 \times 2 \times 5 \times 3 \times 5 \times 3}$$

Multiply by 5×3 to make pair

$\therefore$ The least perfect square is

$$= 4 \times 4 \times 15 \times 15 = 3600$$

$$62. (b) \text{LCM}(25, 50, 75) = 25 \times 2 \times 3 = 150$$

⇒ Remainder when 43582

divided by 150

$$\frac{43582}{150}, \text{ we get remainder} = 82$$

⇒ Two possibilities are

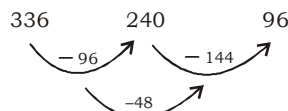
$$= 43582 - 82 = 43500$$

or

$$43582 + (150 - 82) = 43650$$

Nearest = **43650**

$$63. (a) \text{HCF}(336, 240, 96)$$



$$\text{HCF} = 48$$

$$\therefore \text{Stacks of english} = \frac{336}{48} = 7$$

$$\text{Stacks of maths} = \frac{240}{48} = 5$$

$$\text{Stacks of science} = \frac{96}{48} = 2$$

$$\therefore \text{Total no. of stacks} = 7 + 5 + 2 = 14$$

$$64. (a) \text{Let numbers are}$$

$$= 2x, 3x, 4x$$

$$\text{Given, LCM}(2 \times 3 \times 2)x = 12x$$

$$12x = 240 \quad (\text{given})$$

$$x = 20$$

$$\therefore \text{Numbers are} = 2 \times 20 = 40$$

$$3 \times 20 = 60$$

$$4 \times 20 = 80$$

$$\therefore \text{Smaller is } 40$$

$$65. (c) A + B = 45$$

$$A - B = \frac{45}{9} = 5$$

$$\therefore A = 25, B = 20$$

$$\therefore \text{LCM}(25, 20) = 5 \times 5 \times 4 = 100$$

$$66. (c) \text{HCF} = 17$$

$\therefore$ Let numbers are

$$= 17x, 17y$$

$$\text{LCM} = 17xy = 714 \quad (\text{given})$$

$$xy = 42$$

Possible pairs are

$$(1, 42), (2, 21), (3, 14), (6, 7)$$

Possible numbers are (17, 714),

$$(34, 357), (51, 238), (102, 119)$$

but given that both numbers are of three digits)

$$\therefore \text{Numbers are} = (102, 119)$$

$\therefore$ sum of numbers

$$= 102 + 119 = 221$$

$$67. (c) \text{HCF} = 15$$

Product of two numbers

$$= 6300$$

$\therefore$ Let numbers are $15x, 15y$

$$\therefore 15x \times 15y = 6300 \quad (\text{given})$$

$$xy = \frac{6300}{15 \times 15} = 28$$

Possible pairs are = (1, 28), (7, 4)

$$\therefore \text{Total pairs} = 2$$

$$68. (b) \text{LCM}(5, 10, 12, 15)$$

$$= 5 \times 2 \times 6 = 60$$

Smallest no. divided by (5, 10, 12, 15)

Leaves remainder 2 and when divided by 7 leaves no remainder is

$$\frac{60K+2}{7} = \frac{4K+2}{7}$$

$$\text{At } k = 3, \frac{4K+2}{7} \Rightarrow \text{Remainder} = 0$$

$$\text{No.} = 60K + 2 = 60 \times 3 + 2 = 182$$

$$69. (c) \text{LCM}(9, 10, 15)$$

$$= 3 \times 3 \times 10 = 90$$

$$\frac{1936}{90}, \text{ remainder} \Rightarrow 46$$

$\therefore$ Least number when is subtracted from 1936 which gives remainder 7 when divided by (9, 10, 15) is

$$= (46 - 7) = 39$$

$$70. (a) 18 - 5 = 13$$

$$27 - 14 = 13$$

$$36 - 23 = 13$$

$$\therefore \text{LCM}(18, 27, 36) = 9 \times 2 \times 3 \times 2 = 108$$

$$\text{Required number} = 108 - 13 = 95$$

$$71. (c) \text{LCM}(24, 32, 36, 64)$$

$$\Rightarrow 8 \times 3 \times 4 \times 3 \times 2 = 576$$

$$\text{Required no. is} = 576 - 5 = 571$$

$$72. (c) \text{Let the number are } x \text{ and } y \text{ respectively}$$

$$\therefore x : y$$

$$3 : 4 \quad (\text{given})$$

$$\Rightarrow \text{Let } 3m : 4m$$

$$\Rightarrow \text{LCM} = 3 \times 4 \times m = 240 \quad (\text{given})$$

$\Rightarrow m = \frac{240}{12} = 20$
 $\therefore$ Numbers are $A = 3 \times 20 = 60$
 $B = 4 \times 20 = 80$
 $\therefore$ Least number is 60
 73. (c) Let numbers are m and n
 $LCM \times HCF = 24$
 (given)
 $LCM \times HCF = m \times n$
 $\therefore 24 = m \times n$, But $m - n = 2$
 given
 So, such value is (6, 4) and
 greater no. = 6
 74. (b) $HCF = 27$
 $\therefore$ Let numbers are $27x$ and $27y$
 respectively
 $\therefore 27x + 27y = 216$ given
 $\Rightarrow (x + y) = \frac{216}{27} = 8$
 only possible factors are = (1, 7), (3, 5)
 75. (a) Let $HCF = x$
 $LCM = 12x$ (given)
 $\therefore HCF + LCM = 13x = 403$
 $x = 31$
 $\therefore HCF = 31$
 $LCM = 12 \times 31$
 one number = 93 given
 Let other number is y
 $\therefore 93 \times y = 31 \times 31 \times 12$
 $y = 4 \times 31 = 124$
 76. (d) Let No. are a and b
 $a \times b = 20736$
 $HCF = 54$
 We know that $(a \times b) = (HCF \times LCM)$
 $20736 = 54 \times LCM$
 $LCM = \frac{20736}{54}$
 $= 384$
 77. (a) $12 - 2 = 10$
 $16 - 6 = 10$
 $24 - 14 = 10$
 $LCM(12, 16, 24) = 6 \times 2 \times 4 \times 1 = 48$
 Greatest number of four digits = 9999
 $\therefore$ When it is divided by 48 we get = 15
 $\Rightarrow$ The greatest number of 4 digits
 which completely divides the given
 number is = $9999 - 15 = 9984$

$\therefore$ Number is = $9984 - 10 = 9974$
 78. (a) $LCM(15, 20, 35)$
 $= 5 \times 3 \times 4 \times 7 = 420$
 Required number =
 $420 + 8 = 428$
 79. (d) Let the numbers are = $3x$,
 $4x$ respectively
 $\therefore HCF = x$
 $LCM = 3 \times 4 \times x = 12x$
 Given that = $HCF \times LCM = x \times 12x = 2028$
 $12x^2 = 2028$
 $x^2 = 169$
 $x = 13$
 $\therefore$ Sum of numbers = $3x + 4x = 7x$
 $= 7 \times 13 = 91$
 80. (c) $HCF = 48$
 $\therefore$ Let number are $48x$ & $48y$
 respectively
 $\Rightarrow 48x + 48y = 384$
 $(x+y) = \frac{384}{48} = 8$
 So, possible pairs of coprime no. are
 (1, 7), (3, 5)
 $\therefore$ Numbers are (48, 336) or (144,
 240)
 $\therefore$ Difference between numbers is
 $= 336 - 48$
 $= 288$ and $240 - 144 = 96$
 81. (c) Let numbers be $12x$ and $12y$
 respectively
 $LCM = 12xy$
 $12xy = 1056$ (given)
 $xy = 88$
 $\therefore$ Possible pairs are (1, 88) (8, 11)
 possible numbers are
 $= (12, 1056) (96, 132)$
 Given that one number is 132
 so other is 96
 82. (a) We, know that $\Rightarrow (a \times b) =$
 $(HCF \text{ and } LCM)$
 $396 \times 576 = HCF \times 6336$
 $HCF = 36$
 83. (d) $HCF = 8$
 $LCM = 48$
 One number = 24
 Let other number be = y
 $\therefore 24y = 48 \times 8$
 $y = 16$

84. (b) $HCF = 12$
 $LCM = 336$
 One number = 84
 Let another number be = y
 $\therefore 84y = 12 \times 336$
 $y = 48$
 85. (d) Product of number = 216
 $HCF = 6$
 $LCM = \frac{216}{6} = 36$
 86. (a) $HCF = 18$
 $LCM = 378$
 One number = 54
 Let another number be = y
 $\therefore 54y = 18 \times 378$
 $y = \frac{18 \times 378}{54} = 126$
 87. (b) $LCM(20, 28, 32, 35)$
 $\Rightarrow 4 \times 5 \times 7 \times 8 = 1120$
 $LCM = (20, 28, 32, 35) = 1120$
 $\therefore 1120$ divided by 20, 28, 32, 35
 completely
 $\therefore$ Let x be subtracted from 5834,
 $\therefore 5834 - x = 1120$
 $x = 5834 - 1120 = 4714$
 88. (d) $LCM(6, 12, 18)$
 $LCM = 6 \times 2 \times 3 = 36$
 $\Rightarrow$ To find perfect square split the
 LCM into factors and make pair
 of factors so that it becomes the
 square.
 $\Rightarrow LCM = 2 \times 3 \times 2 \times 3 = 36$
 $\frac{2 \times 2 \times 3 \times 3}{\boxed{\quad} \boxed{\quad}} = 36$
 $\Rightarrow$ Which is already a perfect
 square
 89. (c) Let numbers are = $3x$ & $4x$
 respectively
 $LCM = 84$ (GIVEN)
 $\therefore LCM$ of number = common factor
 (other factors)
 $= x \times 3 \times 4 = 12x$
 $12x = 84$
 $x = 7$
 $\therefore$ Numbers are = $3x = 7 \times 3 = 21$
 $4x = 7 \times 4 = 28$
 Greater number is 28

90. (b) HCF = 12
 $\therefore$ Let numbers are $12x$ & $12y$ respectively
 $\therefore$ Given that $(12x + 12y) = 84$
 $\Rightarrow \frac{84}{12} = 7$
 $\therefore x + y = 7$
 $\Rightarrow$ possible factor are $(1 + 6), (2 + 5), (3 + 4)$
 $\therefore$ Total factors are **3**
91. (c) HCF = 3
 $\therefore$ Let numbers are $3x$ & $3y$ respectively
 LCM $\Rightarrow 3xy = 105$ (given)
 $\Rightarrow xy = \frac{105}{3} = 35$
 $\Rightarrow$ also given $= (3x + 3y) = 36$
 $\therefore x + y = 12$
 $\therefore$ We required sum of reciprocals of numbers
 $\Rightarrow \frac{1}{3x} + \frac{1}{3y} = \frac{x+y}{3xy}$
 $\Rightarrow \frac{12}{3 \times 35} = \frac{4}{35}$
92. (a) Let HCF = x
 LCM = $44x$
 Given HCF + LCM = $44x + x = 45x$
 $45x = 1125$
 $x = \frac{1125}{45} = 25$
 $\therefore$ HCF = 25,
 LCM = 25×44
 $\Rightarrow$ Also given that one number = 25
 Let another number = y
 $\therefore 25y = 25 \times 25 \times 44$
 $y = \frac{25 \times 25 \times 44}{25}$
 $= 1100$
93. (c) HCF = 12
 $\therefore$ Let numbers are $12x$ & $12y$ respectively
 LCM $\Rightarrow 12xy = 924$
 (given) $\Rightarrow xy = 77$
 $\Rightarrow$ possible pairs are
 $= (1 \times 77) (7 \times 11)$
 $\therefore$ Only two pairs are possible
94. (a) LCM = 520
 HCF = 4
 one number = 52
 Let other number is = y
 $\therefore 52y = 4 \times 520$
 $y = 40$
95. (d) HCF = 96
 LCM = 1296
 one number = 864
 Let other number is = x
 $\therefore 864 \times x = 96 \times 1296$
 $x = 144$
96. (b) Let HCF = x
 $\therefore$ LCM = $4x$
 $\therefore$ Given HCF + LCM = 125
 $x + 4x = 125$
 $5x = 125$
 $x = 25$
97. (b) HCF = 13 (given)
 Let number are $13x$ & $13y$ respectively
 $\therefore$ Also given $13x \times 13y = 2028$
 $13 \times 13 \times xy = 2028$
 $xy = \frac{2028}{13 \times 13} = 12$
 $\therefore$ Possible pairs are $= (1, 12) (3, 4)$
 only two pairs are possible
98. (d) LCM = 120 (given)
 LCM is the product of one common factor and other different factors of the given numbers.
 $\therefore$ Factorize the given LCM = 120
 $= \frac{2 \times 2 \times 3 \times 5 \times 2}{4(3 \times 5 \times 2)}$
 $=$ Here 4 is common factor
 (common factor is the HCF of the given number)
 $\therefore$ HCF = 4
 So, for the given numbers the HCF should be multiple of 4
- $\Rightarrow$ Hence go through options which is not a multiple of 4 is 35
 Hence answer is **35**.
99. (d) LCM (16, 18, 20, 25)
 $\Rightarrow 4 \times 4 \times 9 \times 5 \times 5 = 3600$
 $\Rightarrow$ 3600 will be completely divisible by the given number so, 4 remainder obtained by adding '4' in the LCM
 $\Rightarrow$ But it should not leave any remainder when divided by 7
 So, given number should be
 $\Rightarrow \frac{(3600k + 4)}{7} = \frac{2K+4}{7}$
 $\frac{2K+4}{7}$ at $k = 5$, remainder = 0
 At given condition satisfy.
 $\Rightarrow$ No. = $3600K + 4 = 3600 \times 5 + 4$
 $= 18000 + 4 = 18004$
100. (b) LCM (24, 36, 54)
 $\Rightarrow 12 \times 2 \times 3 \times 3 = 216$ seconds
 $\Rightarrow$ They will change simultaneously after every 216 seconds
 $\Rightarrow \frac{216}{60} \Rightarrow 3\frac{36}{60} = 3$ minute 36 second
 They change 1st at 10:15:00 am
 So, again they change at
 $= 10:18:36$ am
101. (b) For HCF of fractions take HCF of numerators and LCM of denominators
 HCF of 3, 5, 6 = 1
 LCM of 4, 6, 7 = 84
 Hence, HCF of fractions = $\frac{1}{84}$
102. (a) LCM (200, 300, 360, 450)
 $\Rightarrow 10 \times 4 \times 5 \times 3 \times 3 = 1800$ seconds
 $\Rightarrow$ They meet at the starting point after every 1800 seconds
103. (b) LCM (20, 30, 40)
 $\Rightarrow 4 \times 5 \times 3 \times 2 = 120$ minutes
 $\Rightarrow \frac{120}{60} = 2$ hours
 They 1st bell at 11 am.
 So,
 the again bell after 2 hours at $11 + 2 = 1$ pm.
104. (c) Cows = 945
 Sheep = 2475

⇒ For largest flocks take HCF 108. (d) HCF = A

$$\begin{array}{ccc} \Rightarrow 945 & & 2475 \\ & \searrow & \nearrow \\ & -1530 & \end{array}$$

⇒ For HCF take difference of number HCF will either be the difference or its factor

$$\Rightarrow 1530 = 17 \times 3 \times 3 \times 5 \times 2$$

$$= 17 \times 2 \times 45$$

$$\text{HCF} = 45$$

∴ Maximum animals in each flock = **45**

∴ No. of flocks of cows are

$$= \frac{945}{45} = 21$$

⇒ No. of flocks of sheep are

$$= \frac{2475}{45} = 55$$

Total number of flocks = 21 + 55 = **76**
(45, 76)

105. (b) LCM (10, 15, 20)

$$\Rightarrow 5 \times 2 \times 3 \times 2 = 60$$

⇒ Largest 4 digit number = 9999
divide 9999 by LCM of given number

⇒ We get remainder = 39

⇒ So, to divide completely subtract it from (9999 - 39) = 9960

∴ 9960 is the largest four digit number which is completely divided by the given numbers (9960)

106. (c) 411 - 3 = 408

$$684 - 4 = 680$$

$$821 - 5 = 816$$

⇒ Take HCF of given number to get required greatest number

$$\begin{array}{ccc} \Rightarrow 408 & 680 & 816 \\ & \nearrow & \nearrow \\ & d_1 & d_2 \\ & 272 & 136 \\ & \searrow & \searrow \\ & 136 & \end{array}$$

∴ HCF = 136

Take difference of the numbers.

107. (b) HCF = 5

Ratio of numbers is (3 : 4)

Given

So, numbers are = 15 & 20

$$\therefore \text{LCM} = 5 \times 3 \times 4 = 60$$

$$\text{LCM} = B$$

Given numbers are x & y respectively.

(Product of numbers is ⇒ Product of LCM × HCF)

$$\Rightarrow xy = AB$$

Now ⇒ $A + B = x + y$ (given)

Take cube on both sides

$$\Rightarrow (A + B)^3 = (x + y)^3$$

$$\Rightarrow A^3 + B^3 + 3AB(A + B)$$

$$= x^3 + y^3 + 3xy(x + y)$$

$$\Rightarrow A^3 + B^3 + 3xy(x + y)$$

$$= x^3 + y^3 + 3xy(x + y)$$

$$\therefore A^3 + B^3 = x^3 + y^3$$

(Put $AB = xy$ from above)

109. (c) HCF = 44

$$\text{LCM} = 264$$

Let numbers are = x & y

$$\therefore \text{Given} = \frac{x}{2} = 44$$

$$x = 88$$

$$\therefore y = \frac{\text{HCF} \times \text{LCM}}{x} \Rightarrow \frac{44 \times 264}{88} \Rightarrow 132$$

110. (c) for maximum distance covered

$$\bullet \text{ LCM (63, 70, 77)}$$

$$= 9 \times 7 \times 10 \times 11 = \mathbf{6930}$$

111. (d) For greatest number divide to take HCF

HCF

$$\begin{array}{ccc} 200 & & 320 \\ & \searrow & \nearrow \\ & 120 = 40 \times 3 & \end{array}$$

(for HCF take difference or take factor of difference)

$$\text{HCF} = 40$$

(for greatest number divided by take LCM)

112. (c) HCF = (84, 90, 120)

$$\begin{array}{ccc} \Rightarrow 84 & 90 & 120 \\ & \searrow & \nearrow \\ & 6 & 30 \\ & \searrow & \nearrow \\ & 24 & \\ & \Rightarrow 6 \times 4 & \end{array}$$

$$\text{HCF} = 6$$

∴ Maximum no. of books in each stack = 6.

113. (b) 729 - 9 = 720

$$901 - 5 = 896$$

$$\text{HCF (720, 896)}$$

$$\begin{array}{ccc} 720 & & 896 \\ & \searrow & \nearrow \\ & 176 & \end{array}$$

$$\Rightarrow 11 \times 16$$

$$\Rightarrow \text{HCF} = 16$$

114. (a) HCF = 12

Given ratio of numbers = A : B : C
1 : 2 : 3

∴ Numbers are = A = 12

$$B = 12 \times 2 = 24$$

$$C = 12 \times 3 = 36$$

$$(12, 24, 36)$$

115. (d) HCF = z

Given ratio of the numbers = $x : y$

$$\Rightarrow \text{LCM} = z \times x \times y = xyz$$

LCM is the product of HCF and other factors

116. (b) Let two consecutive positive even numbers

are $(2x + 2)$ and $(2x + 4)$

HCF = 2 (given)

common (factor)

$$\therefore \text{LCM} = 2(x + 1)(x + 2)$$

↓

HCF (other factors)

$$\Rightarrow \text{LCM} = 84 \text{ (given)}$$

$$\therefore 2(x + 1)(x + 2) = 84$$

$$(x + 1)(x + 2) = 42$$

$$\Rightarrow x^2 + 3x + 2 = 42$$

$$x^2 + 3x + 2 - 42 = 0$$

$$x^2 + 8x - 5x - 40 = 0$$

$$\Rightarrow x(x + 8) - 5(x + 8) = 0$$

$$(x - 5)(x + 8) = 0$$

$$x = +5$$

$$x = -8$$

But numbers are even, so $(x = 5)$

$$\therefore \text{Number are} = 2 \times 5 + 2 = 12$$

$$\text{and } 2 \times 5 + 4 = 14$$

$$\Rightarrow \text{Sum of numbers are} = 12 + 14 = 26$$

117. (b) $P = 2^3 \cdot 3^{10} \cdot 5$

$$Q = 2^5 \cdot 3 \cdot 7$$

$$\begin{aligned} \text{HCF (P, Q)} &= (\text{common factor of P \& Q}) \\ &= 2^3 \cdot 3 \end{aligned}$$

118. (a) Let fraction is $\frac{x}{y}$

$$\therefore \frac{x-4}{y+1} = \frac{1}{6} \quad (\text{given})$$

$\Rightarrow$ Cross multiply the equation

$$\Rightarrow 6x - 24 = y + 1$$

$$6x - y - 25 = 0 \quad \dots(i)$$

Again, $\frac{x+2}{y+1} = \frac{1}{3} \quad (\text{given})$

$$\Rightarrow 3x + 6 = y + 1$$

$$3x - y + 5 = 0 \quad \dots(ii)$$

From equation (i) and (ii)

$$\begin{array}{r} 6x - y = 25 \\ 3x - y = -5 \\ \hline x = 10 \end{array}$$

$$\therefore y = 35$$

$$\therefore \frac{x}{y} = \frac{10}{35} = \frac{2}{7}$$

$$\text{Fraction} = \frac{x}{y} = \frac{2}{7}$$

$$\text{Numerator} = 2$$

$$\text{Denominator} = 7$$

$$\text{LCM (numerator, denominator)}$$

$$\Rightarrow 2 \times 7 = 14$$

119. (b) HCF of fractional numbers is

$$\left(\frac{\text{HCF of numerator}}{\text{LCM of denominator}} \right)$$

$$\therefore \text{HCF} \left(\frac{2}{3}, \frac{4}{5}, \frac{6}{7} \right)$$

$$\Rightarrow \left(\frac{\text{HCF } 2, 4, 6}{\text{LCM } 3, 5, 7} \right) = \frac{2}{3 \times 5 \times 7} = \frac{2}{105}$$

120. (b) $110 - 2 = 108$

$$128 - 2 = 126$$

$$\therefore \text{HCF } (108, 126) = 18$$

121. (b) for least or minimum number of canes we should have maximum capacity canes for required quantity

$\Rightarrow$ For this we take HCF of given quantities.

$$\text{HCF } (21, 42, 63) = 21$$

$\therefore$ Maximum capacity of a cane

$$= 21 \text{ litres}$$

$\therefore$ Number of canes of cow milk

$$= \frac{21}{21} = 1$$

$\therefore$ Number of canes of toned milk

$$= \frac{42}{21} = 2$$

$\therefore$ Number of canes of double toned

$$\text{milk} = \frac{63}{21} = 3$$

$\therefore$ Total number of canes = $1 + 2 + 3 = 6$

122. (c) G.C.D. = Greatest common divisor or Highest common factor (HCF)

$$\text{Let G.C.D.} = a$$

$\therefore$ Let number are ax and ay
($ax > ay$)

$$\text{LCM} = axy$$

$$\Rightarrow \text{LCM} = 2 \times \text{larger number}$$

$$\therefore axy = 2 \times ax$$

$$\therefore y = 2$$

$$\text{Also given that}$$

$$\Rightarrow \text{Smaller number} - \text{G.C.D} = 4$$

$$\Rightarrow ay - a = 4$$

$$2a - a = 4$$

$$a = 4$$

$\bullet$ G.C.D = $a = 4$

$\bullet$ $y = 2$

$\therefore$ Smaller number

$$= ay \Rightarrow 2 \times 4 = 8$$

123. (d) HCF (GCD) of a , b number is 12

$$\text{and } a > b > 12 \text{ (given)}$$

$\therefore$ Smallest value of a & b are (36, 24)

124. (a) HCF of co prime number is always 1

$\therefore$ Let numbers are x & y respectively

$$\text{Product of number} = xy$$

$$xy = 117 \quad (\text{given})$$

$\therefore$ Product of number = LCM $\times$ HCF

$$\Rightarrow \text{LCM} \times 1 = 117$$

$$\text{LCM} = 117$$

125. (b) HCF = 12

$\therefore$ Let numbers are $12x$ & $12y$

$\therefore$ Product of two number = $12x \cdot 12y$

$$= 144xy$$

$$\Rightarrow 144xy = 2160$$

$$\Rightarrow xy = 15$$

$\therefore$ Possible pairs are (1, 15), (3, 5), factors should be co-prime. Two pairs are possible.

126. (a)

$$\left. \begin{array}{l} \text{HCF} = 27 \\ \text{LCM} = 2079 \\ \text{one number} = 189 \end{array} \right\} \text{given}$$

Let another number be y

$\Rightarrow$ Product of numbers = LCM $\times$ HCF

$$\therefore 189 \times y = 27 \times 2079$$

$$y = 297$$

127. (c) LCM (6, 7, 8, 9, 12)

$$\text{LCM} = 3 \times 2 \times 7 \times 4 \times 3 = 504$$

They will toll after every 504 seconds

128. (b) LCM of any fractions is

$$\Rightarrow \frac{\text{LCM of numerator}}{\text{HCF of denominator}}$$

$$\Rightarrow \text{LCM} \left(\frac{2}{3}, \frac{4}{9}, \frac{5}{6} \right)$$

$$\Rightarrow \frac{\text{LCM}(2, 4, 5)}{\text{HCF}(3, 9, 6)} = \frac{20}{3} \Rightarrow \frac{20}{3} \text{ ans.}$$

129. (c) LCM of 6, 9, 12, 15 and 18 = 180

If 180 is divided by these given number remainder will be 0

$\Rightarrow$ To Leave the same remainder 2

$\Rightarrow$ The number will be = $180 + 2 = 182$

130. (c) $x^6 - 1 \Rightarrow (x^2)^3 - 1^3$

$$\text{Using } \Rightarrow a^3 - b^3 = (a - b)(a^2 + b^2 + ab)$$

$$\Rightarrow (x^2 - 1)(x^4 + 1 + x^2 \times 1)$$

$$\Rightarrow (x^2 - 1)(x^4 + 1 + x^2) \dots (i)$$

Again,

$$x^4 + 2x^3 - 2x - 1$$

$$\Rightarrow x^4 - 1 + 2x(x^2 - 1)$$

$$\Rightarrow (x^2)^2 - 1^2 + 2x(x^2 - 1)$$

$$\Rightarrow (x^2 - 1)(x^2 + 1) + 2x(x^2 - 1)$$

$$\Rightarrow (x^2 - 1)(x^2 + 1 + 2x) \dots (ii)$$

$\Rightarrow$ from equation (i) and (ii)

H.C.F is a common term

$$\text{H.C.F} = (x^2 - 1)$$

131. (b) According to the question,

$$\begin{array}{r}
 2300 \\
 -32 \\
 \hline
 2268
 \end{array}
 \qquad
 \begin{array}{r}
 3500 \\
 -56 \\
 \hline
 3444
 \end{array}$$

1176
Difference

$$1176 = 42 \times 28$$

So, Factors of 1176 is 42, 28

$\therefore$ HCF of 2268, 3444 is = 42

132. (c) LCM of 12, 16, 18, 21 = 1008

$$\text{Next number} = 1008 \times 2 = 2016$$

Divisible by all

$\therefore$ 16 is added

$$\text{Sum of digits} = 1 + 6 = 7$$

133.(d) LCM of 5, 6, 7 & 8 = 840

$$\frac{840n+3}{9}$$

$$\Rightarrow \frac{3n+3}{9}$$

$\Rightarrow$ Take $n = 2$

$$\Rightarrow 3(2)+3$$

$$\Rightarrow \frac{9}{9} = \text{Remainder} = 0$$

$\therefore$ Number is $840n+3$

$$\Rightarrow 840(2)+3 [n=2]$$

$$\Rightarrow 1683$$

Sum of digits = 18

$$134. (a) \frac{\text{Remainder of no.}}{19} = \frac{47}{19}$$

$$= [\text{Remainder}=9]$$

135. (c) We know,

$$\text{LCM} \times \text{HCF} = \text{Ist No.} \times \text{IInd No.}$$

$$\text{Let Ist No.} = K$$

$$\text{IInd No.} = 4K$$

$$K \times 4K = 21 \times 84$$

$$K = 21$$

$$\text{Then No.} = 21, 84$$

So, Larger Number = 84

136. (b) According to the question,

$$\text{L.C.M} = 12 \text{ H.C.F}$$

$$\text{H.C.F} + 12 \text{ H.C.F} = 403$$

$$13 \text{ H.C.F} = 403$$

$$\text{H.C.F} = 31$$

$$\text{L.C.M} = 372$$

$$\therefore \text{L.C.M} \times \text{H.C.F} = a \times b$$

$$372 \times 31 = 93 \times b$$

$$b = 124$$

137. (a) According to question,
H.C.F = 9

$\Rightarrow$ Then the two numbers will be
9a, 9b

$$\Rightarrow 9a + 9b = 99$$

$$\Rightarrow a + b = 11$$

$\Rightarrow$ Pair of positive integer

$$(1, 10), (2, 9), (3, 8), (4, 7), (5, 6) = 5$$

138. (a) Let the ratio be = x

$\Rightarrow$ Then two numbers will be 4x
and 3x

$\Rightarrow$ L.C.M. of number

$$120$$

$$\Rightarrow \text{L.C.M. of } 4x \text{ and } 3x = 12x$$

$$\Rightarrow \text{So, } 12x = 120$$

$$x = 10$$

$\Rightarrow$ Therefore, the sum of number is

$$= 4x + 3x$$

$$= 7x$$

$$= 7 \times 10 = 70$$

139. (a) L.C.M of 12, 18, 21, 28 = 252

As, we know greatest four digit
number = 9999

$$\begin{array}{r}
 252 \overline{) 9999} \quad 39 \\
 \underline{-756} \\
 2439 \\
 \underline{-2268} \\
 171
 \end{array}$$

$$= 9999 - 171$$

The number will be = 9828

140. (a) We know smallest five
digit numbers is

$$= 10,000$$

$$\Rightarrow \text{LCM of } 12, 18, 21 = 252$$

$$\begin{array}{r}
 252 \overline{) 10000} \quad 39 \\
 \underline{-756} \\
 2440 \\
 \underline{-2268} \\
 172
 \end{array}$$

$$\text{Difference} \Rightarrow 252 - 172 = 80$$

$\Rightarrow$ Number should be = 10000 + 80

$$= \mathbf{10080}$$

141. (b) LCM of 30, 36, 80 = 720

$$\text{Number} = 720 \times K + 11 \quad (K = 2)$$

$$\text{Then number} = 720 \times 2 + 11$$

$$= 1440 + 11 \Rightarrow 1451$$

142. (a) Greatest prime no. = 97

Least prime no. = 2

$$\text{So, their difference } 97 - 2 = 95$$

143.(c) LCM of 12, 18, 21, 32 = 2016

$$2016 \times K = 2016 \times 2$$

$$= 4032 \quad (K = 2)$$

"4032" is the number which is
completely divided by 12, 18, 21, 32

144. (c)

$$\frac{\text{H.C.F}}{\text{L.C.M}} = \frac{1}{30} \Rightarrow \text{H.C.F} = x \text{ (let)} \quad \text{L.C.M} = 30x$$

$$\text{L.C.M.} - \text{H.C.F} = 493$$

$$30x - x = 493$$

$$29x = 493$$

$$x = 17$$

$$\text{H.C.F} = 17$$

$$\text{L.C.M} = 510$$

So, No. = 17a, 17b

$$\text{L.C.M} \times \text{H.C.F} = \text{I}^{\text{st}} \times \text{II}^{\text{nd}}$$

$$510 \times 17 = 17a \times 17b$$

$$ab = 30$$

Possible no. of pairs

$$\begin{array}{c}
 30 \\
 \swarrow \quad \searrow \\
 1 \times 30 \\
 2 \times 15 \\
 3 \times 10 \\
 5 \times 6
 \end{array}$$

$$= 4 \text{ pairs}$$

145. (b)

$$x, x+1, x+2, x+3$$

$$\text{Ist} + \text{IInd} = \text{IVth}$$

$$x+x+1 = x+3$$

$$x = 2$$

Numbers are 2, 3, 4, 5

Sum of four numbers

$$= 2 + 3 + 4 + 5 = 14$$

146.(d) $210 = 21 \times 10 = 7 \times 3 \times 2 \times 5$

take 2 and 3 with together then
we find number is 5, 6, 7 which
is consecutive number

so

$$\text{I}^{\text{st}} + \text{II}^{\text{nd}} = 5 + 6 = 11$$

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